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RE: Comments of the Southern Forest Resource Assessment

We appreciated the opportunity to help initiate the Southern Forest Resource Assessment (SFRA) in 1998 and have followed the progress of the study with interest. We further appreciate the opportunity to comment on the draft report now. During the preparation of the study we continually stressed the need to consider the impacts of industrial forestry on the Southern forest and communities.

After reviewing the draft SFRA report we feel that while there is ample evidence that industrial forestry practices have had and are projected to have major impacts on the integrity of the Southern forest, this issue and the important policy implications that flow from it have not been adequately analyzed in the drafts of the Executive Summary, Summary Report, and Technical Report papers. We urge you to more directly acknowledge the threat posed by the continued expansion of industrial forestry and the important policy decisions this threat to the Southern Forest presents in the final version of the SFRA report.

As currently organized, the Executive Summary, Summary Report, and the Technical Report papers (specifically the Key Findings and Conclusion sections) read largely as justifications for continuing current industrial forestry practices. Retaining this viewpoint will likely lead to a continued avoidance of the hard policy choices that face decision-makers in Washington, in the Southern states, and in the boardrooms of the corporations whose decisions historically have driven the degradation of Southern forests. It is in that spirit that we present these comments on the draft study.

This study was initiated in large part because of increased public concern about the growth of wood chipping facilities to feed expanding paper and engineered lumber production. Although the SFRA documents that the expansion in the pulpwood sector (paper) of the industry has been the most pronounced, there is no real analysis of this finding, and in fact it is downplayed as insignificant in the report. The link between the increased use of immature trees, the resulting increases in even-aged cutting and the conversion of natural forests to short-rotation plantation management is never clearly made in this analysis. The sections of the report that do discuss chip mills, fail to acknowledge the broader force of change within the market (paper and engineered lumber) by limiting the discussion to satellite chip mills. This narrow discussion of satellite chip mills completely ignores the bigger picture of the market force that is driving increased harvest rates, shorter and shorter rotations and the conversion of forests to intensively managed plantations. Neither the ecological implications of this market trend nor the economic implications are adequately addressed.

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In general, the report contains a lot of useful data regarding the trends in the wood products industry and changes in forest composition. However, it fails to present a balanced analysis of the long-term implications of these trends for biodiversity, water quality and economic stability in rural communities. First, the study fails to address the long-term ecological implications of intensive management of plantations. Given the positive light the study sheds on increased intensity of plantation management as a means to meet projected softwood fiber demand, the failure to adequately address the negative ecological implications results in an inherent bias that runs throughout the document. Second, there is insufficient analysis on the cumulative effects of increased logging and shorter rotations in natural forests on biodiversity, water quality and specific species of concern. Third, the report fails to acknowledge the critical role the wood products industry has played in the destruction of the South's wetlands. Finally, the report fails to present a balanced discussion of the economic data. Not only does the report paint a misleading picture of the economic importance of the timber industry to the South's economy, but it fails to present an objective discussion of findings that provide ample evidence that: 1) the wood products industry (particularly the Paper industry) has an adverse economic impact; and 2) that continued expansion of the paper industry means unsound economic tradeoffs for rural communities across the South.

Another significant shortcoming of the SFRA is the failure to present a more balanced forecast of potential outcomes. The projections upon which the entire study is based are based on an assumption of continued increases in timber production. While this is a critical perspective for assessing the likely future of Southern forests under a "worse case" scenario, an equally critical perspective is one where production remains the same over the 40-year study period. It is only through such an alternatives analysis that the implications of various policy decisions (or lack thereof) can be adequately measured.

You have specifically requested the following types of input in our comments on the SFRA study: (a) gaps in study; (b) additional fine detail needed in discussions; (c) errors; (d) opportunities for additional synthesis of findings; and (e) potential subregional focus areas. Below are our general and specific comments on the Executive Summary, Summary, and Technical Report papers.

## **1. EXECUTIVE SUMMARY AND SUMMARY REPORT**

The Executive Summary and Summary Report both understate, and in some places, mischaracterize some of the major findings of the Technical Report papers. It is critical that these sections be amended in the final report because they are the only sections that will be read by many decision-makers and members of the public. Our general and specific comments on these two summary parts of the report follow.

**1.1 General Comment** -- The major shortcoming of the Executive Summary and Summary Report (and of the entire SFRA as well) is the underestimation of the impacts of the timber industry and industrial forestry practices. The SFRA forecasts that 32 million acres of forest will be lost to sprawl through 2040; yet, there is no similar analysis of the total acres that will

be impacted by industrial forestry practices during the same time period. However, taking the figures of annual harvests as laid out in the report, through 2040 at least 270 million acres of forests will be heavily logged by big timber companies to produce products such as paper. In addition, removals of the South's hardwood forests will exceed growth by 2025. In addition, approximately one in every four acres of the South's "forest" will be a single-species pine plantation by 2040. The use of chemicals in pine plantations will more than double. Despite these alarming trends, the primary conclusion drawn from the Executive Summary is that sprawl poses the biggest threat to Southern forests -- a finding that the USFS chose to highlight in the media when the study was released and one we believe is misleading.

The impacts of big timber companies are exacerbated, not diminished, by increased urbanization, as remaining natural forests become even more important to sustaining wildlife populations, water quality, scenic beauty, recreation, tourism and value-added, quality wood products businesses. The lack of synthesis of the documented negative ecological and economic effects of industrial forestry into the Executive Summary, Summary Report and Key Findings in the Technical Report papers is perhaps *the* major failing of the draft study. The consistent mischaracterization and downplaying of findings damaging to the wood products industry significantly impacts the credibility of this study as an objective analysis. This error needs to be corrected through additional synthesis of the findings of the study and major rewrites of the Executive Summary and Key Findings in the Technical Report paper in the final SFRA report.

**1.1.a "Sustainability"** -- From the context of the Executive Summary and Summary Report the definition of "sustainability" seems to emphasize sustaining the cutting rate and volumes necessary for increased production of wood products as projected in the study's model. This is not the definition of "sustainability" that is appropriate for this analysis. The definition of "sustainability" in this study needs to be broad enough to deal with more than sustaining a wood fiber supply from *natural* forests and *non-natural* pine plantations. The definition must also cover sustaining the biological integrity of native forests, rare forest communities, wildlife species of concern, water quality, wetlands, aquatic ecosystems, and other *natural* resources that make up the Southern forest ecosystem. The narrow view of "sustainability" that is implicit throughout the SFRA explains the study's failure to adequately discuss the broader ecological "sustainability" of the Southern forest. This failure needs to be corrected in the final study.

Moreover, the term "forest" needs to be qualified throughout the SFRA. The Glossary defines the term "forest" as "an assemblage of woody vegetation typically attaining positions in a plant community at the tallest level; attains height and diameter growth of canopy-layer trees within established averages for the species." "Forest land" is defined as "Land that is at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for non-forest use." These broad definitions fail to capture the significant ecological differences between a natural forest and a planted pine plantation. This failure leads directly to the flawed perspective that "forest sustainability" is equivalent to a sustainable fiber supply that is implied throughout the study. This distinction in definition of what constitutes a "forest" is especially significant given the projections of more intensive management of pine plantations that (according to the study itself) will look and act even less like natural forests than today's plantations. This failure needs to be corrected in the final study.

**1.1.b Study Design** -- The Executive Summary and Section 1 of the Summary Report describe a “two-tier” design for the study (region-wide and “small area”) that appears well thought out, particularly since one of the Key Findings of the study notes:

The scale of any watershed analysis is critical to determining specific relationships between land uses and water quality. Effects of land uses, including silvicultural practices, on water quality and aquatic biota are best studied and summarized at much smaller scales. This level of analysis was not possible for this report. (AQUA-1 – Section 5.3.1)

Thus, it is clear how important the second tier of the study *identifying small areas within the South for additional study at finer scales* is (and, importantly, how it is the key area of the study that still needs to be carried out). Unfortunately, the identification of appropriate small areas for further study appears to have been largely ignored in the writing of the Technical Report papers. The “Subregions of Concern” identified in the study are still very large areas (*e.g.*, Southern Appalachians). To facilitate what was a *primary* rationale for the entire study, we would recommend adding a section to each of the technical reports entitled “Small Areas Identified for Additional Study.” This section should be as specific as possible, identifying relevant small geographic areas wherever possible, and otherwise identifying readily determinable environmental criteria that could be used for delineating relevant small areas for future study.

At least one Small Area Assessment of forest sustainability has been conducted through funding from EPA and USFWS. That study, conducted by Jonathan Evans at the University of the South, is currently under peer review. The final results of that study should be incorporated into the Executive Summary of the final version of the SFRA.

**1.1.c Forecasting Change** -- The discussion of Timber Markets in the Executive Summary and Section 2.1 of the Summary Report reflect a “business as usual” projection that is probably appropriate as a *near* “worst case” scenario. Such a scenario is appropriate as one version of “what could happen.” However, these are not the only versions of “what could happen”. One trend that should be examined could be called the “market shift” scenario, where changing use patterns -- particularly in paper, but also the use of engineered wood products, which *is* already discussed in the study -- could result in less intense demands on the Southern forest over the study period. It is important for decision-makers and the public, and especially the wood products industry, to consider the ramifications of such an alternative timber market outcome in the final study. [An example of a multiple scenario approach (rather than the simple projection the SFRA employs), excerpted from a recent World Resources Institute study, is included in the Appendix for your review in this regard.] In addition, increased regulation of the timber industry and industrial forestry practices could have an effect on the rate of harvest across the region, yet this is not addressed in the forecast.

**1.1.d Regulation** -- The discussion of Social Institutions in the Executive Summary and Section 2.4 in the Summary Report does not deal adequately with the issue of regulating timber harvesting in the South. The study’s discussion gives the impression that the only areas where regulation is affecting, or should affect, timber harvesting are urbanizing regions. There, the



study apparently assumes that regulation is only relevant to the effect that it generally *discourages* forestry in those areas. We believe that this discussion is very misleading and incomplete. [The recent World Resources Institute study described above, also discusses potential silvicultural regulation scenarios, and is included in the Appendix for your review in this regard also.]

Moreover, the issue of forest practice regulation in the South does not appear static. For example, Virginia appears ready to enact a penalty requirement for failure of a logger to notify the Department of Forestry of timbering operations (House Bill 448 in the 2002 General Assembly session). This type of “incremental” increase in governmental oversight of logging may well lead to more regulatory approaches in the South between now and the year 2040. If this were to occur, we believe that important water quality and biodiversity benefits would accrue through a potential reduction in timber cutting and removal. This possibility should at least be briefly discussed in the Executive Summary and Summary Report (and discussed much more extensively in the AQUA Technical Report papers) in the final study.

**1.1. e Biological Factors** -- The discussion of Biological Factors in the Executive Summary and Section 2.5 in the Summary Report is largely limited to plant diseases, exotic plants, and exotic pests. However, these are not the only biological factors affecting the Southern forest. We believe that this section, which serves as an introduction to the more extensive biological discussion that occurs later under Southern Forest Conditions in the Executive Summary and in Sections 3.2, 3.3, and 3.4 of the Summary Report, should also discuss the many other biological and human factors that interact with plant diseases, exotic plants, and exotic pests to affect the health of the South’s forests. Examples of biological factors that should also be introduced here include other human-induced impacts, such as replacement of natural species by pine plantations, the effects of development-induced sprawl, and resulting threats to biodiversity (particularly ecological community and species of concern issues).

**1.1.f Physical Factors and Interactions** -- The discussion of Physical Factors in the Executive Summary and Section 2.6 in the Summary Report understates the effect of acid deposition on forest vegetation. While it may be arguable that “the vast majority of the South” is not *significantly* affected at present, it is clear from the situation in the high Appalachians (as noted in the HLTH papers) that this issue is of critical importance in that region. Moreover, the more highly stressed nature of high Appalachian ecosystems makes it likely that this region acts as the early warning “miner’s canary” for the rest of the Southern forest and indicates the probability of a more geographically widespread physical environmental problem that interacts with the biological factors mentioned above. These interactions should be discussed in the Executive Summary and in Section 2.7 of the Summary Report (and discussed more extensively in the Technical Report papers). The implications of the “high degree of uncertainty about the direction and magnitude of forest impacts from projected climate changes” also should be discussed here (and discussed more extensively in the Technical Report papers).

**1.1.g Recreation and Tourism** -- Section 5.2 of SOCIO-7 states: “The forest-related recreation and tourism sector is concentrated in areas that are economically more favorable than areas where the wood products sectors is located.” This is an opportunity for additional synthesis of

findings. This is a very important point that should be included in the Executive Summary and Summary Report.

**1.1.h Forestry and Local Economic Conditions** -- Section 5.2 of SOCIO-7 states: "Economic conditions in areas where the secondary wood products sector is concentrated are not as bad as where concentrations of the pulp and paper or primary wood products sectors are located." This is an opportunity for additional synthesis of findings. The author can, for example, also state in this section that there is a higher quality of life in counties with secondary wood products than in counties with paper and pulp industries. This idea should be added to the Executive Summary and Summary Report. Also, the finding that "we would like the sentence, "The relative scarcity of the finance, insurance, and real estate sector also probably reflects the lower level of economic development in areas where the pulp and paper sector is concentrated" to be included in the Executive Summary and Summary Report (see discussion in SOCIO-7 – Section 5.3).

**1.1.i Water Quality** -- The discussions of Water Quality in the Executive Summary and Section 3.4.1 of the Summary Report make a number of findings that we believe need correction or more detail and discussion. In addition, several important findings from AQUA-1, 3, and 4 need to be reflected in the Executive Summary and Summary Report.

The discussion inaccurately minimizes the effects of cutting and removing timber. The point is not that silviculture is *only* number 10 out of 11 "major" sources of water quality degradation but that it *is* one of the top 10 causes and operates cumulatively with most of the other 10 in contributing sediment, nutrients, and toxic chemicals to the South's waterways. This is a critical case of "editorializing" in what should be a scientific study. In order to avoid the charge that the SFRA is a biased attempt to avoid dealing with the adverse impacts of industrial forestry in an already highly stressed Southern forest, this discussion needs to be made more objective in the final report.

A major effort needs to be made to synthesize cumulative water quality impacts of all "major" sources of water quality at the stream reach and watershed level. This point is imperative and needs more emphasis in the Executive Summary, the Summary Report, and in the AQUA Technical Report papers. Development and use of cumulative impact analysis techniques is the only way to prioritize water quality protection efforts and to move the study meaningfully to the second tier of small area assessments. Analysis of the water quality effects of timber cutting and removal needs to be at the reach and subwatershed level. Therefore, it should be pointed out that the level of detail in the EPA Index of Watershed Indicators is too coarse (*i.e.*, at the 8-digit USGS HUC level) and needs to be refined (probably to the 12-digit HUC level) to produce significant analytical results. It is critical that the final report emphasize this important gap in the study data and analysis.

The discussion of BMP implementation is inaccurate. The sanguine statement that "States report generally high rates of implementation" ignores the major issue regarding voluntary BMP implementation – does it work? Our investigation of the issue indicates that voluntary BMPs do not get broadly implemented (see the discussion of the AQUA-4 Technical Review paper). The individual state reports highlighted in the SFRA are highly subjective and reflect the understandable tendency of the states to view the situation in the "best light." More objective

studies of BMP implementation for the chip mill studies in North Carolina and Missouri conclude that voluntary BMP implementation may be as low as 12-16 percent, but in any case are certainly not “generally high.” In addition, lack of policies in most southern states requiring pre-harvest notification renders state BMP compliance reports suspect as there are no clear mechanisms at the state level for monitoring BMP compliance rates. This is another critical inaccuracy that needs to be corrected in the final report.

**1.1.j Wetlands** -- The discussions of Wetlands in the Executive Summary and Section 3.4.2 of the Summary Report contain statements that we believe need correction or more detail and discussion. In addition, several important findings from AQUA-2 need to be reflected in the Executive Summary and Summary Report.

It should be noted that because of their large-scale nature, the National Wetlands Inventory maps tend to underestimate, and more importantly *under-record* the presence of wetlands. Thus, the wetland acreages estimated in the study (both existing and potential future losses) are likely to represent *minimum acreages*. As a result, the analysis very likely underestimates the importance of wetlands in the overall landscape context and also underestimates the effects of all land use activities on wetland functions in the environment. This is an important point in view of the low impacts to wetlands predicted from forest practices in AQUA-2 (which we believe is in error and in need of correction there also).

As AQUA-2 Section 5.2 also notes, “few generalizations can be made about biogeochemical cycling and nutrient retention functions because of the variable nature of responses of riverine wetlands to harvests, and the inability of current scientific methods to detect subtle biogeochemical changes due to silvicultural activities. . . The ability to predict whether long-term shifts in biogeochemical transformations occur due to silviculture is minimal and that there is a critical need to understand how silviculture affects the enhancement of water quality in riverine wetlands.” This point needs to be explicit in the Executive Summary and the Summary Report.

The assumption in AQUA-2 Section 5.2.3 that “the effects of harvesting are short-lived and that these stands will return to pretreatment species composition” is incorrect. Indeed, the authors admit almost immediately in the text that “[a]dditional long-term research is needed to continue to track the development of the plant community and ecological functions in harvested stands compared with unharvested stands.” This point is important enough to warrant mention in the Key Findings section of that paper and in the Executive Summary and Summary Report as well.

We believe that the discussion in AQUA-2 of the extreme uncertainty about silvicultural practices related to the impacts of timber cutting and removal in wetlands makes it extremely unwise to assume that their impacts are minimal -- and certainly undermines any conclusion that such practices “enhance” water quality. Thus it is in error to presume that the effects of harvesting are short-lived and that these stands will return to pretreatment species composition. Given that “minimal ability to predict,” this study should not conclude “when hydrology is not permanently altered and sites are allowed to regenerate naturally, indications are that, in time, they function similarly to unaltered wetlands.” These points are important enough to warrant mention in the Key Findings section of that paper and in the Executive Summary and Summary Report as well.

Finally, the findings related to historical loss of wetlands, both forested and otherwise, need additional detail and synthesis and need to be highlighted in the Executive Summary. Causation of the historical loss of wetlands needs to be discussed in more detail. According to a US Fish & Wildlife Report entitled *Status and Trends of Wetlands in the Conterminous United States 1986 to 1997*,

Forestry practices have a substantial influence on forested wetland areas (Dahl 1999). The availability of timber used largely for processing pulp and producing paper was the basis for forestry management practices... Conversion of bottomland forest to managed plantations accounts for most Changes in the freshwater forested category in the southeastern United States. – p.50.

The relationship between industrial forestry practices and the significant loss of freshwater forested wetlands needs to be made clear in the AQUA-2 Key Findings and highlighted in the Executive and Summary Reports.

In summary, these foregoing issues need to be discussed more objectively in AQUA-2. In addition, the exemption of ongoing silvicultural activities from Section 404 of the Clean Water Act needs additional analysis in conjunction with the above issues. The results of that more objective analysis of the effects of current permissive silviculture in wetlands need to be accurately presented in the Executive Summary and Summary Report.

**1.1.k Aquatic Species of Concern** -- The discussions of Aquatic Species of Concern in the Executive Summary and Section 3.4.3 of the Summary Report contain important statements and findings that we believe need to be more adequately and accurately reflected in the Broad Findings discussion of the Executive Summary and in Sections 3.4.4 and 4.1 through 4.5 (see discussion below). Importantly, both Section 3.4.3 of the Summary Report and AQUA-5 catalogue just how imperiled the Southern forest's aquatic ecosystem is. The discussion of the "future" in the Executive Summary does not reflect this imperilment and needs to be changed to do so in the final study.

**1.2 Broad Findings** --As we have noted above, we believe strongly that it is vital for the discussions of Broad Findings in the Executive Summary and Section 4.1 of the Summary Report to accurately reflect the discussion and findings of the Technical Report papers. Therefore, we believe that a number of Broad Findings need correction, additional detail and discussion, or modification to disclose gaps in the study data or analysis. Moreover, we believe that several additional key findings need to be added to the Executive Summary and Summary Report in order to reflect information in the Technical Report papers. These changes are critical to avoid the appearance that the SFRA is a forest industry *status quo* support document rather than a true "assessment" of present and likely future of the Southern forest. Thus, we suggest the following changes to the Broad Findings in the Executive Summary and Section 4.1 of the Summary Report.

As a **General Comment** on the Broad Findings, we believe that slight additional detail that is included in the Section 4.1 Broad Findings in the Summary Report (plus our additional suggested changes below) should also be included in the Broad Findings in the Executive Summary. The additional detail will not add significantly to the length of the Executive Summary but would add significant additional important detail. Given the importance of the Broad Findings, we believe that you should consider locating them at the beginning of the Executive Summary and Summary Report (as is the case with the Key Findings in the Technical Report papers). Our **Specific Comments on the existing “Broad Findings”** are as follows:

- **Several forces are affecting the condition of southern forests.** We believe that this Broad Finding is understated with respect to the amount and extent that the forces affecting the Southern forest are “pervasive.” This finding should give examples of this *pervasiveness*: e.g., the almost complete disappearance of “old growth” and longleaf pine stands, the occurrence of more threatened ecosystems than any other region in the nation, the loss of some 140 million acres of the native forest that existed at the time of European colonization, and the replacement of 32 million acres of remaining existing natural forest by pine plantations since the 1950s. While several of these pervasive changes are mentioned later in the Broad Findings, they need to be linked to all of the human “forces of change” up front to provide the appropriate context for the second Broad Finding, on the threat of urbanization (see comment below). It should also be made clear here that more timber cutting occurs in the Southern forest than in any other *country* in the world. In view of this, the first finding should also reflect the potential that reduced timber cutting pressure could offer to render these adverse conditions less “pervasive” to water quality and biodiversity. This Broad Finding should be amended to read: “Several forces, including urbanization and increased production of wood products, are affecting the condition of Southern forests.”

**Urbanization presents a substantial threat to the extent, condition, and health of forests.** This Broad Finding needs to be linked to the first finding to make it clear that current timber cutting practices *and* urbanization work in tandem to fragment and reduce the extent and natural productivity of the Southern forest. The Technical Report papers demonstrate clearly that urbanization and current industrial forestry practices *together* constitute the major threat. The nature of the “important localized economic and ecological implications” in this finding should be explained more thoroughly (*i.e.*, why do both forest fragmentation *and* pine plantation replacement have these implications and what are they?). This Broad Finding should read “Urbanization, combined with a continued increase in the production of wood products, poses a substantial threat to the extent, condition and health of forests.”

- **Population is growing, and the social context is changing.** This Broad Finding should highlight the “public values” mentioned, particularly the emerging need for additional forest-based recreation, the lack of adequate public forestland to accommodate that increased recreational need, the potential conflict between timber cutting on both public and private land, and the recreational, aesthetic, and biotic preferences of the increasingly urbanized Southern population, and the inverse relationship between communities with concentrated timber cutting and economic well-being. This Broad Finding should read: “Population is growing and the social context is changing to favor natural amenities over timber production.”

- **Total forest area will remain the same, but subregional and compositional changes continue.** Total natural forest area will not remain the same as natural forests are projected to decline by 25 million acres through 2040. This statement only holds true if pine plantations are considered “forests”. This is, as discussed above, a major flaw throughout the study. This Broad Finding should read: “Total area of natural forest will decline by yet another 25 million acres through 2040 due to urbanization and conversion to pine plantations.” This finding more accurately reflects the findings in the Technical Report papers.

**Timber production is forecast to expand but will not deplete forest inventories below current levels.** This broad finding as currently stated obscures the implications of such increases in timber production on biodiversity and water quality and instead implies that all is well because timber inventories will not be depleted. We recommend this Broad Finding read as follows: “If timber production expands as forecasted, increased use of chemicals and genetically modified trees as well as increased conversion of native forests to plantations will be required to ensure forest inventories are not depleted below current levels.”

As this suggested change suggests, this Broad Finding is misleading because it fails to acknowledge that sustaining forest inventories for an expanding wood products industry is dependent on increased use of genetically modified tree species, the use of chemical fertilizers and herbicides, continued conversions of natural forests to pine plantation, and further depletion of the *natural* forest “biologic” inventory. We believe this is tantamount to saying we can produce *fiber*, but only at increasing cost to our *natural* forest. This is a critical point that is obscured in the SFRA as currently written. The public needs to be aware of this potential tradeoff up front if the study is to be viewed as honest and objective. Nor is it clear that even current forest inventories are adequate for the cutting level the SFRA forecasts. A recent report by the World Resources Institute (WRI) notes:

Timber stocks in the U.S. South contribute 55 percent of total U.S. harvest and support over 70 percent of U.S. wood pulp capacity. Some studies suggest that stocks in this region may have been seriously depleted in recent years, especially in softwoods (Lyddan, 1997; Ekstrom, 1997). Current harvest rates are substantially above the most recent U.S. Forest Service projections and nearly 15 percent above forest growth rates (Haynes et. al. 1995). Moreover, some of the remaining inventory is located in ecologically sensitive areas and may not be harvestable. For example, of the 15 million acres of forestland in Virginia, Only 55 percent is available for harvest. The other 45 percent is classified as “urban” or as unsuitable due to slope, fragmented acreage, or spatial arrangement (Virginia Department of Forestry, 1995). Similarly, for the South as a whole, available timber may be 25 to 50 percent less than the overall inventory when one takes into account the stock in unsuitable areas and the objectives of the non-industrial private landholders who own two thirds of Southern timber (Lyddan, 1997).

Our point is not that the SFRA forecast is wrong and the WRI report is infallible. Our point is, as we have noted earlier, that we believe that it is critical for the SFRA to examine alternative forecast scenarios, including the possibility that cutting rates may not be acceptable, or even attainable, because their achievement may require unacceptable damage

to natural ecosystems. This point should be discussed earlier in the Broad Findings; we believe it should be moved to a position immediately after the first Broad Finding.

Finally, the fact that hardwood removals are projected to exceed growth in 2025 should be followed immediately by the finding in TIMBR-1 that expansions in OSB production will account for most increases in hardwood harvests.

- **Investment in pine plantations is forecast to expand to meet increased softwood demand, but this has implications for the ecological characteristics of southern forests.** The assumptions upon which this forecast is based (*i.e.*, massive use of genetically modified tree species, pine plantation replacement, and further depletion of the natural hardwood forest) should be mentioned here too. The positive environmental implications of a reduced-demand for paper products scenario should also be considered in this Broad Finding – particularly in view of the statement that the “dynamics (*i.e.*, ecological changes) . . . are not well understood at a broader landscape level.” This implies that the timber industry currently is “flying blind” with regard to its understanding of long-term potential ecological damage to the Southern forest and is incapable of self-regulation. This argues strongly for governmental imposition of a more precautionary approach to large-scale plantation management.

In addition, the Executive Summary fails to acknowledge the findings the Technical Report documenting an 800% increase in the use of chemical fertilizers since 1990 and that the use of chemical fertilizers and herbicides are expected to at least double by 2040. We recommend this Broad Finding be amended to read “Investment in pine plantations is forecast to expand to meet increased softwood demand, but this will be accompanied by an increase in the use of chemical fertilizers and herbicides and will have implications for the ecological characteristics of southern forests.”

- **Changing land use and harvest patterns will have important impacts on people.** The economic benefit of the wood products industry is overstated and misrepresented here as the Technical Papers clearly document that where the wood products industry is concentrated, the communities are economically worse off than other communities (see below comments on the SOCIO Technical Report papers). In addition, the regional importance of the recreational sector of the forest economy should be highlighted. This is an extremely important Broad Finding and therefore should probably be put nearer the beginning of the Executive Summary and Summary Report findings. We recommend this Broad Finding be changed to reflect the findings in the SOCIO section of the report as follows: “Communities where the wood products sector is concentrated are economically worse off than communities where the recreation sector is located.”
- **Southern forests have proven resilient but some components are scarce and therefore at risk.** We believe that this broad finding is understated. In fact, the Technical Report papers indicate that there are more threatened forested ecosystems in the South than any other region of the country. In addition, the area of natural forest across the South declined from 356 million acres in colonial times to 182 million acres today and half of the forested wetlands of the South (35 million acres) have been lost. These trends need to be not only highlighted here, but also encapsulated in the heading of this broad

finding. We recommend this Broad Finding read as follows: “Southern forests have been significantly altered to the point that there are currently more endangered forest ecosystems in the South than any other region in the country.”

- **Scarce forest types have high ecological value.** We believe that this broad finding is very much understated. If the scarce forest types are so valuable, why does the SFRA spend so little time discussing the historical and projected causes of this scarcity and affirmative measures to preserve and enhance these forest types? This Broad Finding needs significant expansion. This Broad Finding should read: “Scarce forest types have high ecological value and should be protected from logging and urbanization.”

In addition, we believe that the following point needs to be added (either as an additional Broad Finding or as an addendum to a current Broad Finding) and reflected in the Summary Report and Technical Report papers:

- **Market changes towards recycled fiber sources may reduce cutting pressure on the Southern forest and reverse historical trends of natural forest conversion to plantations.** Consideration of this “reduced cutting” alternative should be added to the simple “business as usual” forecast of the SFRA as currently written. As we have noted earlier, this scenario would result in a reduction of the severe environmental impacts predicted in the Technical Report papers. [See the approach used by WRI on this issue in the excerpt of its recent report contained in the Appendix.]

**1.3 Subregions of Concern** -- The discussions of Subregions of Concern in the Executive Summary and Section 4.2 of the Summary Report identify several important subregions that warrant additional consideration. However, “concerns” are limited to insect infestations and forest loss related to urban development. The list of concerns and discussion should be broadened to include water quality and biodiversity issues related to both the cutting of natural forests and the expansion of pine plantations. Additionally, smaller “subregions,” such as Green Swamp and the Cumberland Plateau, where our ForestWatch activities report concerns over replacement of native hardwood forests with pine plantations, and ditching and draining wetlands should be discussed. Finally, there is no mention of how additional subregion-types of concern, such as smaller watersheds, might be identified and prioritized (*e.g.*, by rare ecosystem type or stream water quality degradation).

**1.4 Implications for Ongoing Programs** – The Implications for Ongoing Programs discussions in the Executive Summary and Section 4.3 in the Summary Report need to discuss the implications of the projected increases in timber cutting and the potential for BMP implementation through voluntary and mandatory programs. Moreover, despite the mention of significant environmental problems related to federal and state environmental laws, there is no suggestion on how these problems might be addressed consistent with the suggestions on how current and projected timber cutting rates might be continued into the future. Our comments on Technical Report paper AQUA-4 regarding the actual implementation of BMPs in the South demonstrate that voluntary programs simply do not get the level of implementation required to protect water quality. This issue needs discussion in this section, along with the implications of the potential for reduced timber cutting pressure to render adverse impacts to water quality and biotic diversity less “pervasive” (see the first Broad Finding).



**1.5 Knowledge Gaps and Scientific Uncertainties** – The Discussion of Knowledge Gaps and Scientific Uncertainties in the Executive Summary and Section 4.4 in the Summary Report needs to have some discussion of how the “imperative to have timely data with which to gauge changes in forest conditions” noted in the previous comment will be accomplished, given the finding that “tools are not available for (1) forecasting the implications of these multiple, interacting changes on the area, structure, and function of southern forest ecosystems, and (2) fully understanding the impacts on values that are derived from these systems.” With the uncertainty the SFRA documents, the “full speed ahead” forest cutting scenario projected and advocated by the study and the wood products industry seems particularly unwise in view of the severe impacts already experienced by the Southern forest – as demonstrated by large number of threatened and endangered biotic communities in the South. A suite of more “precautionary” approaches, including the “reduced timber cutting pressure” scenario we advocate, need to be considered and discussed in this section.

## **2. TECHNICAL REPORT PAPERS**

### **General Comment --**

In general, the Technical Report papers provide a good overview of existing conditions in the Southern forest. However, the utility of the papers is limited because of the key assumption that current industrial forestry trends will continue unabated into the future. We believe that a more balanced “alternatives” approach like that employed under the National Environmental Policy Act would be appropriate from the standpoint of the decision-makers and stakeholders who will use the SFRA as a point of departure in the coming years. We would encourage you to look at the “alternative scenarios” approach employed by WRI in its recent report on the pulp and paper industry as a model for expanding the scope of your forecast evaluation (see Appendix).

We have also identified a number of discrepancies between the Key Findings and Conclusions in the Technical Report papers and the actual data and discussion contained in the text. These discrepancies consistently downplay and mischaracterize data in the report that is damaging to the wood products industry and some Key Findings are simply not supported by the data.

### **TERRA-**

#### **General Comment**

1. There is no attempt to incorporate the findings of two relevant studies that shed significant light on the impacts of industrial forestry practices on biodiversity. The findings from the North Carolina Chip Mill Study (2000) and the Tennessee Valley Authority Chip Mill EIS (1992) should be incorporated into the findings of this section. Both of these peer-reviewed, governmental reports contain critical information regarding the potential impacts of industrial forestry practices and resulting forest changes on threatened and endangered species as well as species of concern.

2. The following findings in TERRA-4 ought to be included in the “Key Findings” section as well as the Executive Summary and Summary Reports:

- Pine plantations generally provide “poor wildlife habitat.” (TERRA-4 -- Section 5.2.2.4)

- High stocking rates (700-1000 seedlings/acre), increasing use of fertilizers and herbicides, reduction of fire as a management tool, among other management changes, essentially have eliminated many of the benefits for early successional species of wildlife that were formerly provided in pine plantations that were less efficiently managed. Declining trends continue for important species like northern bobwhite, American woodcock, and many species of high-priority nongame migratory birds associated with early successional habitats (Capel and others 1994, Krementz and Jackson 1999, Hunter and others 2001). (TERRA-4 – Section 5.2.2.4)
- To be effective, conservation efforts for many wildlife species must cover entire landscapes. (TERRA-4 Discussion and Conclusions)

3. The report does not adequately address the wide-scale increase in logging (clearcutting and other forms of even-aged management) on T&E species, or other species of concern. An expansion of the analysis conducted in the NC Chip Mill Study would be appropriate here.

### **SOCIO: Social/Economic Factors**

#### **SOCIO-1**

##### **Gaps in the Discussion**

1. This section states “The base scenario indicates a growth in urban area from about 20 million acres in 1992 to 55 million acres in 2020 and to 81 million acres in 2040 (Figure 10). Without price adjustments in rural land markets (addressed below), land would shift out of agricultural, forest and other uses. Forest area declines by about 12 million acres, agriculture by about 13 million acres, and other by about 7 million acres.”

The following issues need to be addressed in the final report to fill the gaps in the discussion:

- How is it determined how much “forestland” sprawl will consume and how much agricultural land will be consumed by sprawl? Does the analysis look at what land use type is closest to metropolitan areas and thus determine the most likely land use category to be utilized for urban growth or is the model based on county averages?
- The final report should make it clear how much native forest will be lost due to sprawl and conversion to pine plantations compared to how much agricultural land will be consumed by sprawl.
- The final report needs to make a clear statement about what constitutes a forest and why a pine plantation is considered a forest rather than an agricultural crop. If pine plantations are an intensively managed crop, the native forestland converted to pine plantations needs to be considered as forest lost to agriculture and added to the forestland land lost in the land use change equation to arrive at a figure for forest loss.

### **SOCIO-3: How do current policies, regulations, and laws affect forest resources and their management?**

##### **Gaps in the Discussion**

SOCIO 3.1.6 "While meeting their environmental objectives, protective regulatory policies reduce overall production and raise unit costs for people who are raising a timber crop." Please include, " on the other hand, not implementing protective regulatory policies can raise costs to the public for such important amenities as water purification, air filtration, health problems due to increased air pollution and exposure to toxic chemicals used by the forestry industry, and other negative externalities."

**SOCIO-4: What motivates private forest landowners to manage their forestland and how are their management objectives formed?**

**General Comment**

This section includes some general, sweeping statements that supply more rhetoric than science. The most disturbing statement is one in which the author claims that the forest industry is sustainable.

**Gaps In the Discussion**

1. SOCIO 4.5.3 states: "It is assumed that the management strategies of forest industry owners are designed primarily for long-term profit from timber production. This does not suggest that such owners do not also manage forests for secondary, non timber benefits. As a matter of both good business sense and environmental concerns, many private industry owners in the South are strong proponents of practices that ensure sustainability of multiple resource values." This sentence appears to be a form of rhetoric, rather than a truly scientific statement. What is the evidence for this? Please describe what is meant by sustainability. Who has defined sustainability for the purposes of this study? What are the multiple resource values?

2. SOCIO 4.5.5.3 states: "Gaddis (1996) concluded that government cost-share incentives programs are generally regarded as equitable to everyone, with program costs to taxpayers offset by reductions in prices of forest-related goods (such as wood products), as well as for public amenities." This statement is very general, and does not include any real facts. Where is the analysis of all subsidies, tax breaks, incentives, and/or abatements given to the wood products industry in the South? In particular, the study should include examples such the long history of abatements given to the paper and pulp industry in Alabama.

In addition, this statement ignores the relationship between "reduced prices of forest-related goods" and increased consumer demand, which drives increased harvests. It also fails to address the "public amenities" that are lost due to the industrial forestry practices employed by the wood products industry and subsidized by the taxpayer.

**SOCIO-5: What role do forests play in employment and local economies in the South?**

**General Comment**

This section includes an analysis of jobs and income in the forest industry that relies on IMPLAN. We realize that users of economic models must make certain assumptions. However, IMPLAN has numerous flaws (discussed in more detail below) that need to be addressed here.

**Need for Additional Detail**

1. Section 5.2.1 states: "Dependency, and in particular dependency on resources and manufacturing, is often cited as a contributor to lower economic well-being, but recent studies have found that southern rural counties with greater than 20 percent of employment in manufacturing are better off than counties with less than 20 percent (McGranahan)." There needs to be additional fine detail following this sentence. Please include studies that point to the conclusion that southern rural counties with higher percentages of employment in wood products industries are worse off than counties with a lower percentage of employment in the wood products industry.

Many investigators have studied specific examples of the relationship between forest-dependence (economic dependence on the forest industry), poverty, and timberland concentrations and poverty. For example, in a study of rural Georgia, forest-dependent county well-being varied negatively with concentrations of timberland (forestland capable of producing 20 cubic feet of industrial wood per acre per year and not withdrawn from timber utilization). That is, high timberland counties characteristically have low well-being measured in terms of households living at or below the poverty level (Overdevest, 1994).

In Alabama, timberland concentration has been shown to be correlated with such indicators of social well being as outmigration, unemployment, low educational attainment, and poverty (Bliss, Sisock, and Birch, 1998). County politics typically are dominated by large business and property owners with a strong interest in maintaining existing social relations, low property taxes, and minimal government services.

After the 1970s, counties in Alabama without pulp and paper mills were able to grow out of poverty much faster than the counties with paper and pulp mills. Unemployment rates dropped during the period 1980-1990 in counties without mills, following a statewide and nationwide trend, whereas in the pulp and paper mills counties the rate climbed 21 percent (from 8 percent in 1980 to 10 percent in 1990). Employment opportunities in the pulp and paper sector are limited by a strong trend toward replacement of labor by capital in both harvesting and processing phases of production.

More recently, the Atlanta Constitution Journal found that counties with chip mills (facilities that grind whole logs into chips for making paper and chipboard) tend to have more people living below the poverty level than counties without chip mills (Eversley, 2001).

For more information, please see: Overdevest, C., and G.P. Green. 1994. Forest dependence and community well-being: A segmented market approach. *Society of Natural Resources* 9:111-131, Bliss, J.C., Sisock, M.L., and T.W. Birch. 1998. Ownership matters: Forestland concentration in rural Alabama. *Society and Natural Resources* 11:401-410, Bliss, J., Walkingstick, T.L., and C. Bailey. 1998. Development or dependency? *Journal of Forestry* 96(3):25-30, Joshi, M.L., Bliss, J.C., Bailey, C., Teeter, L.J., and K.J. Ward. 2000. Investing in industry, underinvesting in human capital: forest-based rural development in Alabama. *Society and Natural Resources* 13:291-319, and Moskowitz, Watson, and Smith, Dogwood Alliance, Industrial Forestry: An Economic Failure for Southern Communities Moving Beyond a Dependence on Resource Extraction, in press, Eversley, M. 2001. As more of Georgia's trees come down, red flags go up. *Atlanta Constitution Journal*, 8 April.

2. Section 2 states: "Recreation and timber are the primary forest-based economic sectors today, and this chapter focuses on the roles of these two sectors in the southern economy." We understand that these two economic sectors may be the easiest to compare quantitatively. However, the "quality of life" sector needs to be mentioned here, or at least discussed in a qualitative way. It is mentioned in the second paragraph of 2.2. However, to be more precise, it needs to be mentioned when recreation and timber are mentioned. To leave it out, seems to be a political decision, as opposed to a scientific decision.

## **Errors**

1. We do not share the study team's enthusiasm of the IMPLAN model. We realize that users of economic models must make certain assumptions. However, IMPLAN has numerous flaws that render its conclusions erroneous. Therefore, we feel that the entire method in this section is inherently in error, and that finer details and analysis are necessary.

We do however, acknowledge the statement: "Input-output models implicitly assume an economic- or export-based economy, and therefore that exports are the sole drivers of economic growth." However, there are several concerns with economic-base models, and the relationship between growth and economic well-being or quality of life is still unclear (Niemi and Whitelaw 1997). Input-output models do not provide a complete evaluation of the links between the economy and well-being. However, they do provide insights into one important dimension of this relationship -- the link between forests and jobs and income. Other aspects of well-being are addressed in Chapter SOCIO-6 and Chapter SOCIO-7." We appreciate that an attempt was made to bring up the quality of life issue. However, here are some opportunities for an additional synthesis of ideas.

IMPLAN makes the erroneous assumption that forest-based jobs are primary jobs. All other jobs in the state are secondary, or exist to support the primary workers. Deciding to call forest-based industries primary, and all other jobs, secondary, carries a political message: all economic activities are not equal in importance. The primary economic activity must be nurtured and supported for without it the state or community would fade into a ghost town. This simple economic base approach to local economies has proven to be misleading because it confuses what the actual model depicts, gives an incomplete picture of the actual economic base, and contains specific empirically false assumptions.

IMPLAN also assumes that income earned in export-oriented activities circulates through the local economy, putting people to work in locally oriented economic activities that provide the vast majority of jobs. Fluctuations in export income cause fluctuations in nonexport sectors in a relationship summarized by a more or less constant multiplier.

This approach ignores that which determines the multiplier: the character and structure of the local economy. The more quickly injected income leaks out of the economy, the smaller the multiplier. So, the multiplier is inversely related to the fraction of local spending that goes to importing goods. The more self-sufficient a local economy is, the longer injected income circulates within and the larger the overall multiplier impact. In that sense the impact of export

earnings is determined by the structure of the local economy and the range of locally produced goods and services, and not just by the volume of export earnings.

### Gaps

1. Models like IMPLAN, at least in the way it is being used in these Technical Report papers, would dismiss a restaurant or recreational facility as secondary, or passively relying on export earnings to survive. The alternative interpretation would say that such local economic activity absorbs and holds dollars longer in the local economy, increasing jobs and income. In fact, it is the strength and diversity of local sectors that determine the size of the multiplier.

Local economic activities like recreation and services slow or stop leakage and generate jobs and income. This is often referred to as "income substitution" activity. So, if an area offers abundant recreational opportunities, for example, residents will travel away less than if it offers few. An attractive environment leaks fewer dollars and therefore generates more jobs and income.

The conventional model takes a snapshot of a local economy at a particular time, but ignores the dynamics of a local economy over time, concentrating on isolated economic impacts at the expense of economic development. Consider, for example, the impact of retirees. This income circulates within the local economy, but nothing has been exported. Such "footloose" forms of income can be substantial. For example, in North Carolina, retirement income accounts for nearly eight percent of the state's personal income; retirement income plus dividends, interest and rents account for close to 23 percent (BEA REIS data, 1997). Whatever attracts or holds this income is a major part of the local economic base. The same holds for small businesses, "lone eagle" telecommuters, or travelers who come to a place because of its natural environment.

In fact, results from surveys on business location criteria indicate that scenic amenities, quality of life, and access to recreation are some of the most important reasons, relative to other more traditional economic criteria, for businesses to locate and stay in a rural region (see, for example, Jerry D. Johnson & Raymond Rasker, *The Role of Economic and Quality of Life Values in Rural Business Location*, 11 J. Rural Studies 405,406, 412-414 (1995). Amenity factors have been deemed particularly important in the location decisions of four types of companies: corporate headquarters, high-technology, research and development, and services.

In thinking about a local economy, such nonexport sources of income have to be taken into account. Extraction and export are only some of the forces shaping the local economy. So, the conventional economic base model often degenerates into the claim that site-specific natural resources which industry extract and process are directly or indirectly responsible for almost all jobs and, therefore, for the ongoing survival of a local economy. The alternative "environmental view" recognizes that people are attracted to certain desirable social and natural environments, creating, by virtue of numbers, an available supply of labor at relatively low cost.

Therefore, all of the claimed secondary jobs that are calculated by the IMPLAN model in the Forest Products Journal article are suspect and difficult to interpret rationally. In a growing economy, you can lose a lot of primary jobs and none of the secondary workers will notice (see the new publication by Ernie Niemi and Ed Whitelaw, *The Sky Did Not Fall: The Pacific Northwest's Response to Logging Reductions*, ECONorthwest (1999).

Niemi and Whitelaw conclude that the widespread predictions of economic catastrophe following Judge Dwyer's ruling on the northern spotted owl, and subsequent decreased logging on public lands, did not materialize. Instead of collapsing, the region's economy expanded. This was because logging's importance in the economy had diminished markedly and, conversely, unlogged forests had become much more important by the beginning of the 1990s. The USDA Forest Service, utilizing the IMPLAN model, forecasted a loss of over 25,000 jobs in the owl region. Instead, total employment in the region rose 27 percent.

The problem stemmed from the many bad assumptions inherent in IMPLAN, discussed above, that assumed a false economic base. First, analysts assumed that high levels of timber industry employment would continue, ignoring both the fact that the industry is constantly reducing the numbers of workers they employ, and that they had been logging at rates that the forest simply could not sustain. Second, the outdated models assumed that the timber industry was the base of the economy, and ignored the fact that modern economies have become more dynamic and diverse, and do not stand atop just one industry, ready to fall if it falls.

We also understand that IMPLAN assumes infinite supplies (of timber, for example), available at current prices. This is an unacceptable assumption, considering the scarcity of certain forest amenities. For example, IMPLAN would assume that just because there is a shift in demand for furniture, that more trees would be cut, and the lumber industry would increase production. It does not imply that there is a limit to the amount of lumber that can be cut to meet that demand, or that other uses for those trees, such as recreation or water purification, might be of higher value, and thus, with the right public policy decisions, demand would be shifted to another state, region, or country entirely.

We are also suspect of the use of value-added to determine contributions of certain industries to GSP, as stated in the Forest Products Journal report. We understand that the cost of materials, supplies, containers, fuel, purchased electricity, and contract work is subtracted from the value of shipments to derive a measure of value added. However, none of the costs to society, the so-called "externalities" are added into this formula. These externalities can be calculated by deriving the replacement or added costs of doing business. This has been illustrated by numerous economists for many different socioeconomic contributions, including water quality, watershed stability, sport and commercial fisheries, and others.

In conclusion, the utilization of a model like IMPLAN, which is based on an input-output model, provides no analysis of the overall economy, and no indication of the effects of forest-based industries on that economy.

Instead, the question should be framed as follows: "What is contributing to the growth of the economy in the South? And, what impacts do extractive, forest-based industries have on these other industries?" These questions are less biased, and more helpful to citizens and other policy makers.

It is estimated that by the year 2010, the six Southern Appalachian states will contain an additional 9.1 million people (see World Resources Institute, *The 1993 Information Please*

*Environmental Almanac*, (1993). The regional economy in the Southern Appalachian states has outperformed the U.S. economy in many important economic indicators. As a result, aging baby boomers in Southern Appalachian states have more leisure time, more discretionary dollars, and are interested in recreation and protection of natural resources (SAMAB, 1996). Forest-based industries, are often in direct conflict with these needs, and in fact, pass many externalized costs onto this segment of the population. The public has a right to a thorough analysis of these costs.

### Opportunity for Synthesis of Additional Findings

Below is just a cursory example of how the study team can utilize BEA REIS data to give us an overall and relative view of the South's economy, and attempt to answer some of these questions. We use North Carolina as an example.

#### THE ECONOMY

The general conclusion in the SFRA seems to be that southern forest-based industries make substantial contributions to the economies of each state. In total, forest-based industries in the South employ about 633,000, accounting for 1.5 percent of total employment in the region. In North Carolina, they account for 108,221 jobs, or 2.7 percent of employment.

This is in contrast to the 1,157,630 jobs in the service sector, 855,272 jobs in overall manufacturing, and 775,034 jobs in retail trade. In other words, 2.7 percent of employment pales *in comparison* to other industries in the state (see Table One).

**Table One**  
Employment in North Carolina—1997

Total full- and part-time employment	4,612,376	% of Total
Ag. serv., forestry, fishing, and other	55,289	1.20%
Forestry	672	0.01%
Mining	5,267	0.11%
Construction	302,364	6.56%
Manufacturing	<b>855,272</b>	<b>18.54%</b>
Paper, furniture, & lumber/wood	122,418	2.65%
Transportation and public utilities	197,278	4.28%
Wholesale trade	200,638	4.35%
Retail trade	<b>775,034</b>	<b>16.80%</b>
Finance, insurance, and real estate	272,532	5.91%
Services	<b>1,157,630</b>	<b>25.10%</b>
Government and government enterprises	703,245	15.25%
Federal, civilian	60,623	1.31%
Military	122,160	2.65%
State and local	520,462	11.28%



State	168,188	3.65%
Local	352,274	7.64%

Source: BEA REIS data, 1997.

The same can be said of personal income or earnings in forest-based industries. Other kinds of manufacturing, services and government supply the bulk of the personal income to the state. Forest-based industries contribute only 1.4 percent of earnings to the overall economy (see Table Two).

**Table Two**  
**Personal Income in North Carolina—1997**  
(thousands of dollars)

Total Personal Income	172,154,182	% of Total
Ag Serv., forestry, and fishing	741,164	0.43%
Forestry	11,226	0.01%
Mining	198,057	0.12%
Manufacturing	<b>30,493,988</b>	<b>17.71%</b>
Lumber and Wood Products	1,334,913	0.78%
Paper and Allied Products	1,092,792	0.63%
Construction	8,558,694	4.97%
Transportation and Public Facilities	7,921,424	4.60%
Communications	1,706,705	0.99%
Wholesale Trade	7,776,387	4.52%
Retail Trade	12,261,569	7.12%
FIRE	8,148,002	4.73%
Services	<b>28,345,208</b>	<b>16.47%</b>
Government	<b>20,212,155</b>	<b>11.74%</b>

Source: BEA REIS data, 1997.

As stated above, retirees, and the transfer payments they bring with them into rural communities, are an important component of overall personal income statistics. Although retirees are never considered a "primary" industry, they actually contribute nearly eight percent of total personal income to the state, and have a relatively small impact on community infrastru

**Table Three**  
Contribution of Retirement Income  
(thousands of dollars)

Total Personal Income	172,154,182	% of Total
Earnings	127,746,971	74.20%
Transfer Payments	28,610,532	16.62%
Retirement	<b>13,721,400</b>	<b>7.97%</b>
Other Transfer Payments	14,889,132	8.65%

Source: BEA REIS data, 1997

The economy in the South is changing. Yet, this is not reflected in the IMPLAN model. For example, personal income from forestry from 1987-1997, in terms of actual earned income, declined. Lumber and wood products income has risen slightly, although their importance in terms of percentage of the total state personal income has declined. Other industries are on the rise, particularly, finance, insurance, and real estate (FIRE), and services.

**Table Four**  
Changes in Personal Income—1987-1997  
(thousands of dollars)

	1997	% of Total	1987	% of Total
Total Personal Income	172,154,182		125,612,943	
Ag Serv., forestry, and fishing	741,164	0.43%	482,678	0.38%
Forestry	11,226	0.01%	14,486	0.01%
Mining	198,057	0.12%	239,942	0.19%
Manufacturing	30,493,988	17.71%	28,403,735	22.61%
Lumber and Wood Products	1,334,913	0.78%	1,130,735	0.90%
Paper and Allied Products	1,092,792	0.63%	1,053,380	0.84%
Construction	8,558,694	4.97%	6,720,989	5.35%
Transportation and Public Facilities	7,921,424	4.60%	6,643,501	5.29%
Communications	1,706,705	0.99%	1,376,960	1.10%
Wholesale Trade	7,776,387	4.52%	5,929,249	4.72%
Retail Trade	12,261,569	7.12%	10,111,993	8.05%
<b>FIRE</b>	<b>8,148,002</b>	<b>4.73%</b>	<b>4,639,196</b>	<b>69%</b>
<b>Services</b>	<b>28,345,208</b>	<b>16.47%</b>	<b>6,033,776</b>	<b>12.76%</b>

Government	20,212,155	11.74%	15,936,053	12.69%
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Source: BEA REIS data, 1987 and 1997. 1987 dollars adjusted to 1997 dollars using the CPI.

IMPLAN is unable to tell us how the forest-based industries affect the rise of jobs in these other areas. This type of information is important, especially since we are well aware that industries are often able to attract employees to a state like North Carolina, because of the high quality of life and locational assets offered by a state with beautiful, protected forests.

### Other errors

1. The Key Findings state: "In 1997, The USDA Forest Service contributed more than \$330 million to the Southern economy for management of the national forests, research and development, State and private forestry, and payments to States." According to the Thoreau Institute, Region 6 lost \$48 million in timber sales in 1997.

2. Section 5.2.1 states: "Some areas are still highly dependent on a single industry, including timber, lumber, furniture and pulp and paper. The rural areas are still part of the Old economy based on manufacturing and resource extraction (Gale and McGranahan, Gibbs 2001)." This is an error. Increasingly, rural areas in the South are based on retiree income and service sectors. Before you make a blanket statement like this, please include names of town in the rural areas that are supposedly part of this old economy, figures that support this claim, and other factual information.

"For example, in 1998, 8 percent of Mississippi income derived from wood products, while only 5 percent of jobs derived from wood products. This result implies that wood products jobs have higher than average wages." There is not enough information here to make that assumption and it should be deleted. We don't know what percentage of that income came from the timber holders, the executives that live in another region or the stockholders of the timber company, if it is a publicly held company. So, this in no reflects the average wages of the workers.

3. Section 5.3.1 states: "The percentages of all southern jobs and income coming from wood products are declining. This decline does not necessarily imply that the industry is declining in importance." This statement makes no sense, and is therefore an error. It is not a scientific statement, but rather a political statement. For example, from an economic development perspective, this is not good news. Industry may be benefitting shareholders, but not local workers in rural places.

4. Section 5.3.2. states "To calculate the indirect (what producers buy) and induced (what consumers buy) effects of the wood products industry, we used the IMPLAN input-output model to develop response coefficients, such as the number of jobs per million dollars of final demand. Response coefficients were also developed for public timber harvests by using the expenditures made by the national forests in the South to proxy for the production relationships of public timber producers. Public timber production coefficients were determined from the National Forest System accounting as reported for each forest at the USDA National Finance Center. Expenditures by the national forests were classified into a program area, and all of the timber

classifications were bridged to IMPLAN sectors. This procedure results in expenditures in each sector for the production of national forest timber."

IMPLAN uses expenditures that are taken from the Forest Service's TSPIRS, or Timber Sale Program Information Reporting System,. In September 21, 2001, the GAO published a report titled, "Financial Management: Annual Costs of Forest Service's Timber Sales Timber Sale Program Information Reporting System." The GAO found that ".....ultimately it was the serious accounting and financial reporting deficiencies that existed at the Forest Service during fiscal years 1998 and 1999 that precluded us from making an accurate determination of the total federal costs associated with the timber sales program for fiscal years 1998 and 1999. These deficiencies rendered the Forest Service's cost information totally unreliable. One practice allowed Forest Service employees to make changes to previously recorded cost information without creating any record of the changes (i.e., an audit trail). This, coupled with the large number of transactions processed each year, made it impracticable, if not impossible, for us or anyone to accurately determine the Forest Service's timber sales program costs."

Because the entire analysis in section 5.3.2 is based upon unreliable cost accounting data, this section is a serious error.

5. Section 5.4 states: "Few forest-based recreation activities generate direct income for public land..." Fee Demonstration Projects on public lands have been in effect for at least 6 years. Fees are generated that go directly back to the forests where the recreation took place.

5. Section 5.43 states: "The substitution of one site for another in both recreation and wood products will lead to geographic shifts in economic costs and benefits, but may or may not represent an economic loss." This would assume that one recreation area is a perfect substitute for another, and that there is not a strong sense of place for recreationists. This is absolutely false. For example, try to explain to the millions of visitors to the Grand Canyon in Arizona that they can simply shift their visitation over to another, similar canyon in a neighboring state. This would represent a great economic loss, both directly and indirectly.

### **Opportunities for additional synthesis of findings**

1. In Section 5.1.1 "Figure 2 shows the average annual rate of job growth for the 10 major economic sectors in the South and United States between 1969 and 1998. In all sectors except agriculture, southern growth outpaced the national averages. Manufacturing jobs declined in the United States while they were increasing in the South, and agricultural jobs increased faster in the United States than in the South. These changes reflect a continuing shift away from agriculture to manufacturing and service sectors in the southern economy." Further synthesis of ideas is needed. Please mention and explain in the text the great disparity between the minimal increases in manufacturing (including wood products), agriculture and mining, versus the large increases in FIRE, services, and others.

2. Section 5.3.2 states:"In future analyses, particular attention should be given to these and surrounding counties in determining how changes in national forest harvest levels might influence local economic structure and well-being." The national forests are public lands, owned

by all taxpayers, regardless of whether or not they are local. Therefore, in future analyses, particular attention should also be paid to these stakeholders who are further away from the source, and the values they place on standing forests, clean water, air, etc.

3. Section 5.4 states: "For recreation on both public and private land, the major economic impact is the money spent in local communities by recreationists." There are also large expenditures made by people purchasing equipment to recreate and view wildlife (cameras, canoes, tents, etc.) and other outdoor forest-based activities, as well as expenditures made going to and from a recreation spot.

4. Section 5.4.3 states "Another source of discussion regarding the two forest uses is the disparity between the average annual incomes from the two sectors (Table 16). The wood products average is higher than the southwide economy average, which is higher than the average of the three recreation methods used. Income per job (not a wage rate) ranges from less than \$5,000 per year for timber to over \$52,000 per year for pulp and paper. The low level for timber production may reflect the part-time nature of this work. GRP per job, also shown in table 16, is highest for pulp and paper (over \$82,000 per year) and lowest for wood furniture and recreation (about \$33,000 per year)." Opportunity for further synthesis of ideas. While a relatively few jobs in the paper and pulp sector pay salaries in the \$50,000s, these jobs are relatively rare. Please describe how many jobs are available in this upper income bracket, and how many are actually subsistence level wages.

5. Section 5.4.3 states: "Recreation and wood products contribute to the local community by providing jobs and income. These are generally viewed as positive effects of development." Where are the surveys to show that this is true? Some individuals may have high willingness to pay values, and value wilderness more, than say, providing jobs and income to others. People may also place be unwilling to pay for the high costs associated with this industry, such as lower water quality, loss of scenic views, loss of biodiversity, etc.

6. Section 5.5 reads: "Rural communities are worse off generally than more urban communities." What does this mean? When comparing what? In terms of amenities, they may, in fact, be better off. That is, if clean air and clean water are valued. This statement appears to be a subjective one, rather than a scientific one.

7. Section 5.5 states: "Berck and others (1992) found that problems in rural communities resulted more from remote locations and subsequent transportation costs than from specific forest products industries." Perhaps in 1992, transportation costs were an issue. However, post-NAFTA, transportation costs have become a less important input to a firm's costs. Many firms are now viewing labor costs important enough to relocate overseas. Problems in rural communities often result from lack of infrastructure and other necessary public amenities due to lack of civic engagement of the forest products industries

8. Section 5.5 states: "Because forestland is owned by middle and upper income households, revenue from uses will go to these households (Marcouiller and others 1995)." According to Socio 4, Key Findings, less than 1 percent of owners holding tracts larger than 500 acres controlled 65 percent of the timberland intended for harvest. The majority of all timberland (70

percent) was held in tracts of at least 100 acres, by less than 6 percent of all owners. Tracts over 500 acres alone represented nearly half the total private timberland acreage (Birch 1996). What percentage of these are households and what percentage are large corporations? This is critical to determining whether benefits accrue to households or distant stockholders.

**SOCIO-6: What are the supplies of and demands for forest based recreation and other non-commodity uses of forests in the South?**

This section has some very interesting information about recreation uses of the forests in the South. However, there is no analysis of the tradeoffs involved in the expansion of industrial forestry practices that replaces the natural diversity of southern forests with monoculture pine plantations.

**Additional fine detail needed in discussions**

Socio 6: 2 states: "Many, and possibly most, people would argue that recreation and other nontimber uses are the most important and highest valued uses of forests. The value of these uses is evident in the high demands for recreation opportunities in the region. As we report in this Chapter, some of these demands are growing very rapidly." Opportunity for further synthesis of ideas. If this is the case, why then don't we see any really accurate studies of the long term impacts of industrial forestry on these values?

**opportunities for additional synthesis of findings;**

1. Section 6. 4.6 states: "Depending on the type and intensity of recreation use, the type and fragility of a forest site, and the type and level of site management, recreation in forested ecosystems impacts soil, water, vegetation, and animal life." We agree that recreation can have some adverse impacts on forested ecosystems. However, at the same time, there must be a comparison of the damage that industrial forestry has on the very same types of ecosystems. For example, the reduction in vegetative cover and the accompanying erosion from foot or horse travel should be compared with damage from heavy logging equipment. "The chemicals used in site management or by recreationists can change the chemical properties of soil." How does this compare to the millions of tons of herbicides and fertilizers used to maintain a pine plantation? This same discussion is completely missing from TMBR – 2.

2. We have the same concern for the section on nontimber forest products. "Looking for leaves, twigs, vines, ferns, cones, fruits, bark, foliage, sap, firewood, poles, and boughs, these gatherers can have very significant impacts by interrupting balances among species and their habitats. Removal of edibles such as walnuts, hickory nuts, ramps, wild blueberries, blackberries, elderberries, persimmons and a wide variety of other materials reduces food supplies for wild species." Opportunity for added synthesis of findings.

We agree that there can be some impacts on the forest ecosystems from gathering nontimber forest products. But wouldn't most agree that gathering persimmons has much less of an impact wild species than destroying the entire persimmon trees? Please include a side-by-side comparison of the cumulative effects of recreation vs. clearcut logging.

## **SOCIO-7: How do forests and their uses influence the quality of life in the South?**

### **General Comments-**

There is an enormous disconnect between the actual findings in the body of this section, and what is stated in the Key Findings and the Executive Summary. The findings in the body of the report are consistent with what has been reported by many economists and sociologists, in many different areas in the country, for decades—dependence on resource extraction leads to a lower community well being in many rural communities. However, the Key Findings report that "Indicators of social conditions are generally associated with factors having a positive influence on quality of life in areas of concentrated employment in the forest products industry." It is as if the author did the research, and then changed the conclusions at the last minute to answer to a political entity that was not happy with the results.

We are pleased that the authors were able to include a discussion describing the "nonuse" values of forests in the South. We are, however, impatient with the call for "more research" on the issue. The research has been done—actual case studies have been documented.

### **Gaps in Analysis**

1. Socio 7.3.5.2 states: "Evidence in the literature that rural population growth is influenced by the supply of natural amenities caused us to include a measure of population growth in the analysis. Inclusion of a variable measuring the percent change in population allowed us to evaluate the relationship between the degree of industrial concentration in forest-related industries and population dynamics."

The author uses population growth but fails to consider net migration. Population growth will tell us how many people are living in this county, and will include birth rates, high ones often associated with poverty. Net migration will tell us how many people have moved into the county, how many out of the county, and the net difference. Also, first the author mentions that *natural amenities* influence population growth. However, he then says he will use the population growth variable to measure the relationship between migration (population growth) and *forest-related industries*. So, the author is qualitatively describing the relationship between natural amenities and population growth, and then qualitatively describing the relationship between forest-related industries and population growth.

2. Section 7.1, Key Findings, states: "The forest products industry is concentrated in areas where economic opportunities are relatively limited." While this may be true on its face, there is no analysis of the reasons for it. This Key Finding could just as easily have read: "Where the forest products industry is concentrated, other economic opportunities are limited."

The author concludes the county is somehow poor to begin with, and the paper and pulp industry, therefore, will be good for the local economy. This is despite all of the evidence available that points to the opposite conclusion: that the paper and pulp industry does not foster economic development opportunities for rural communities, and that communities that unfortunately have these industries nearby score lower on socioeconomic indicators of well being.

Another argument can be stated: the county became poor because 1) they based their economic future on one, single, extractive industry that is not sustainable, 2) the paper and pulp industry eliminated other economic opportunities for the area, and 3) the industry is not able to alleviate poverty locally, due to lack of civic engagement, tax abatements, and low income to jobs ratios.

The author needs to also mention that it is not an accident that the forest products industry is concentrated where economic opportunities are limited. The industry locates in areas with high rates of poverty, low rates of union organization, and low levels of political and civic engagement because they will receive less opposition when these indicators are present.

Finally, other opportunities in rural communities are limited in the presence of the paper and pulp industry. This is because deforestation and subsequent replanting with monoculture pines, translate to a subsequent loss of high value jobs in the wood products sector and service sector jobs that depend on the natural beauty of the area to attract businesses with highly skilled workers. See for example, *The Living Landscape: Charting a Course: National Forests in the Southern Appalachians*. Volume 5 of 5, (Atlanta, Georgia: The Wilderness Society, 1994).

#### **Additional fine detail needed in discussions**

1. In Socio 7.3.3 there is a need for additional fine detail needed in these discussions. The author uses the criteria that an area must be 58 percent forested in order to be considered for the analysis. This would exclude many important recreation areas. Where does this number come from? The author admits it is arbitrary. Please explain why this percentage is being used. Also, how did the author conclude that 414 counties were recreation/tourism counties?

2. Socio 7: 5.3 states: "Average income per job in the pulp and paper sector is considerably higher than average income for the "typical" job in areas where that sector is located (Table 4). Large amounts of industrial capital are invested in the pulp and paper sector, increasing labor productivity." This should also include a finer detail: These high paying jobs are hard to come by and offer extremely limited pay scales. Although jobs in the paper and pulp mills serve to benefit average income levels, presumably by providing high paying, stable core jobs, it does not appear to provide jobs for those at the low end of the socioeconomic spectrum. Please see Overdevest, C., and G.P. Green. 1994. Forest dependence and community well-being: A segmented market approach. *Society of Natural Resources* 9:111-131.

3. Socio 7 also states: "Large amounts of industrial capital are invested in the pulp and paper sector, increasing labor productivity." There is additional fine detail needed in this discussion. This sentence does not clearly state the negative results of a paper/pulp mill moving into a county. It is giving a positive spin (positive for industry) in a section that is supposed to be devoted to communities (negative for communities). Please include something that explains this. For example, "while extracting more and more natural resources out of the region, the industry is employing less and less people to do it. It also explains the high unemployment rates and poverty." In this section, the author states that 179 out of 2100 counties compared in the study had jobs in the paper and pulp industry, and that the income per job was \$55,000. What was the average wage? How many people held jobs with this salary level? This is an opportunity for finer synthesis of details.



### **Opportunity for Synthesis of Findings**

1. Socio 7.5.2 states: "Economic conditions in areas where the secondary wood products sector is concentrated are not as bad as where concentrations of the pulp and paper or primary wood products sectors are located." This is an opportunity for additional synthesis of findings. The author can, for example, also state in this section that there is a higher quality of life in counties with secondary wood products than in counties with paper and pulp industries. This should be in the Key Findings as well as in the Executive Summary.

2. Socio 7.5.2 states: "Economic conditions in areas where the secondary wood products sector is concentrated are not as bad as where concentrations of the pulp and paper or primary wood products sectors are located." The author can, for example, also state in this section that there is a higher quality of life in counties with secondary wood products than in counties with paper and pulp industries. This should be in the Key Findings as well as in the Executive Summary. In addition, the study is totally void of any analysis of information on the tradeoffs between the pulp, paper and engineered wood sectors and the secondary wood products sector..

3. Socio 7.5.2 states: "The forest-related recreation and tourism sector is concentrated in areas that are economically more favorable than areas where the wood products sectors is located." This should be included as a Key Finding as well as in the Executive Summary.

4. The sentence in 7.5.3, "The relative scarcity of the finance, insurance, and real estate sector also probably reflects the lower level of economic development in areas where the pulp and paper sector is concentrated" should be included in the Executive Summary.

5. Section 7.1, Key Findings, states: "The forest products industry provides good paying jobs relative to other economic sectors in areas where the forest products industry is located." This sentence does not synthesize information that suggests these high paying jobs are hard to come by and offer extremely limited pay scales. Although jobs in the paper and pulp mills serve to benefit average income levels, presumably by providing high paying, stable core jobs, it does not appear to provide jobs for those at the low end of the socioeconomic spectrum. Please see Overdeest, C., and G.P. Green. 1994. Forest dependence and community well-being: A segmented market approach. *Society of Natural Resources* 9:111-131.

### **Errors**

1. Section 7.1, Key Findings, states: "Indicators of social conditions are generally associated with factors having a positive influence on quality of life in areas of concentrated employment in the forest products industry." This is inconsistent with the finding in the body of report, which states that, "The pulp and paper sector is concentrated in areas where median household income is relatively low, a relatively high percent of the labor force is unemployed, a relatively high proportion of the population is living in poverty, and a relatively low proportion of the population have completed high school. Overall, these indicators suggest that this industry is concentrated in areas with limited economic opportunities." This Key Finding is in direct conflict with the actual findings in the report.

2. In Socio 7.4 the author uses FIA data on the county level. According to the Forest Service, this data is not accurate at the county level. Therefore, this entire section might be an error.

3. In Socio 7.5.2, "Linkages between forest dependency and social, economic and demographic indicators", the author states that: "Correlations between the degree of industrial concentration in forest related sectors and social, economic and demographic indicators are shown in Table 2. The pulp and paper sector is concentrated in areas where median household income is relatively low, a relatively high percent of the labor force is unemployed, a relatively high proportion of the population is living in poverty, and a relatively low proportion of the population have completed high school. Overall, these indicators suggest that this industry is concentrated in areas with limited economic opportunities. However, areas of concentrated employment in this sector are positively correlated with the proportion of residences that are owner-occupied and the proportion of the population that vote in presidential elections. They are negatively correlated with the crime rate. Thus, these indicators of social cohesion, safety and potential for collective action are positive indicators of quality of life. However, the degree of industrial concentration in this sector is negatively associated with the rate of population growth. This indicator suggests that net migration to areas of concentrated employment in the pulp and paper sector is lower than net migration to areas with lower concentration of employment in this sector."

Yet: in the Key Findings Socio 7.1, the author states: "Indicators of social conditions are generally associated with factors having a positive influence on quality of life in areas of concentrated employment in the forest products industry. This Key Finding should read as follows: "Counties with high levels of employment in the pulp and paper sector are associated with indicators of poor quality of life like poverty, unemployment, low median income and low rates of high school graduation."

4. Socio 7.5.3 states: "Pine plantations are probably more in conformance with what local people consider acceptable cultural practice in agricultural areas than they would be in many nonagricultural areas." We believe this is an error, as there is no evidence for this in this analysis, nor any reference in any other reports, nor any surveys that would show this to be accurate. Unless surveys are done to in fact prove that local people consider pine monocultures and the associated chemical pollution, soil erosion, and other negative externalities to be acceptable, this sentence should be struck from the report.

5. Socio 7.5.3 states: "Increasing concentration in the pulp and paper industry is negatively correlated with a number of economic sectors, including manufacturing, wholesale, retail and finance, insurance, and real estate. The generally rural location of the pulp and paper sector probably explains the relative scarcity of the wholesale and retail sectors. The relative scarcity of the finance, insurance, and real estate sector also probably reflects the lower level of economic development in areas where the pulp and paper sector is concentrated." This is an error and there is no data to support these conclusions. Many rural counties in the South and in the rest of the country have a high percentage of jobs in these other economic sectors. The truth is that deforestation and dependence on one primary export business, and the lack of infrastructure encouraged by high tax breaks leaves little to encourage other businesses to settle in places where the pulp and paper sector is located.

6. Socio 7: 5.3 states: "It is important to highlight the negative correlation between the pulp and paper and primary wood products sectors and the manufacturing sector. This finding suggests that the forest products industry contributes in a very significant way to the economic base and economic vitality of those areas. In the South as a whole, manufacturing comprises the largest sector in the economic base. The substitution of forest products sectors for manufacturing suggests that, in areas with concentrated employment in those forest products industries, local economies are highly reliant on the income and employment generated by the harvest and processing of timber and timber products."

The decision to name the forest products industry as contributing in a very significant way to the economic base and "vitality" of the region is a political one, rather than a scientific one. The economic base theory that the author relies on is severely out of date. The author assumes that the economy is constructed like a house, with the timber industry as the foundation, or economic base, atop which the remainder of the economy rests.

This model of economic structure may have had some merit decades ago when local and regional economies were pretty simple. But as economies become more diverse and dynamic, the model becomes increasingly misleading (see for example, *The Sky Did NOT Fall: The Pacific Northwest's Response to Logging Reductions*, by Niemi, Whitelaw and Johnston, EcoNorthwest, April, 1999, prepared for Earthlife Canada Foundation and the Sierra Club of British Columbia.)

Therefore we find the author to be in error, and suggest this paragraph taken out of the section.

## **SOCIO 7.6 Conclusions and Discussion**

### **Gaps In the Analysis**

"When looking at the entire wood products industry, on average, income per job in this industry ranges from marginally higher (in the primary wood products and secondary wood products sectors) to much higher than income per job for the "typical" source of employment."

Table four, upon which this statement appears to be based on, fails to disclose the total number of jobs the author is referring to. Since the number of jobs is undisclosed, the difference may not very significant.

### **Errors**

1. In the Conclusions and Discussion it is stated that "The forest products industry, comprised of the primary and secondary wood products sectors and the pulp and paper sector, is a critical component of the economic structure in many areas in the Southern United States."

This sentence is a political and subjective statement, not a scientific statement. We would like to see numbers here. For example, in the Key Findings in Socio 5, It Is stated: "1997, wood products sectors contributed 1.93 percent of jobs and accounted for 2.31 percent of GRP," and, "The percentages of State-level jobs and income in wood products have generally declined since 1969."

It is in error to conclude that 1.93 percent of jobs constitutes "a critical component of the economic structure in the South". This is in sharp contrast to the high levels of jobs in the service

sectors (approximately 25 percent), which is not mentioned as a "critical component" of the South's economy.

2. The statement that "This industry offers good paying jobs in areas where other economic opportunities are limited." is an error. Jobs in this sector are limited, and with increasing mechanization, becoming more scarce.

3. The following statements are not supported by sufficient data and analysis to be accurate: "By providing good-paying jobs, the quality of life was enhanced for people who worked in this industry. In addition, for some people who worked in this industry, quality of life was enhanced by a "way of life" associated with working either in the woods or producing the products made from harvested timber."

This is an error, as there are some very significant problems for workers in this industry. For example, people who work within OSB plants are exposed to toxic MDI and formaldehyde fumes, workers in paper mills are likewise exposed to chemical pollution, drivers on logging trucks have the second highest incidence of traffic accidents, (second highest, after taxis), etc. This statement fails to incorporate how quality of life actually decreased for people exposed to formaldehyde fumes from products made in MDF plants, and how people who live next to the plants suffer from noise and air pollution. In fact, there are many active organizations fighting the closing of these mills in their communities. To omit these details is to omit a big part of the socioeconomic picture.

4. The statement that "And, of course, quality of life was enhanced for everyone who consumed products made from wood, ranging from paper products to fuelwood to fine furniture." is in error. There is no scientific basis for this statement and there needs to be a section here about tradeoffs, and nonmarket forest values. There are high levels of poverty associated with this industry, as discussed in the text. There are negative externalities that people who live near this industry must suffer, like noise and air pollution, high rates of sedimentation, loss of water quality, loss of scenic beauty and recreation areas. There are also losses experienced by people who live away from the region, like loss of knowing that endangered species will continue to exist, and other contingency valuation.

5. The statement "Using the standard assumption that agriculture, mining, nonwood manufacturing, and the forest products industry make up the economic base (Crone, Haynes and Reyna 1999), the forest products industry accounts for about 62 percent of employment in basic industries in areas where the pulp and paper industry comprises at least 10 percent of total employment." is in error as this is far from a standard assumption. Please see Niemi and Whitelaw's, "And the Sky did NOT Fall," as well as Dr. Tom Power's book, "Lost Landscapes and Failed Economies," that both give excellent alternatives to this outdated economic base theory.

### **3. TIMBR: Timber Markets and Forest Management**

**General Comments** – One of the primary reasons this study was initiated was the increased public concern about the growth of wood chipping facilities to feed expanding paper and

engineered lumber production. Although the SFRA documents that the expansion in the pulpwood sector (paper) of the industry has been the most pronounced, there is no real analysis of this finding, and in fact it is downplayed as insignificant in the report. The link between the increased use of immature trees in paper production and the resulting increases in even-aged cutting combined with the conversion of natural forests to short-rotation plantation management is never clearly made in this analysis. The sections of the report that do discuss chip mills, fail to acknowledge the broader force of change within the market by limiting the discussion to satellite chip mills. This narrow discussion of satellite chip mills, completely ignores the bigger picture of the market force that is driving increased harvest rates, shorter and shorter rotations and the conversion of forests to intensively managed plantations. Neither the ecological implications of this market trend nor the economic implications are adequately addressed.

### **TIMBR-1: What are the history, status and projected future demands for and supplies of wood products in the South?**

#### **Additional fine detail needed in discussions**

1. All sections need to clearly define what is meant by forest, forestland, and timberland. At times these terms are used almost interchangeably. Throughout the SFRA, there is confusing language that blurs the line between forests and pine plantations. In many cases this blurring causes the reader to consider pine plantations to be a substitute for native forests.

For example, TMBR-1 contains many statements like “Increases in pine plantation acres differ among the scenarios considered. These projected increases are similar to the projected acreage of aggregate losses of the natural forest management types, keeping forest area largely unchanged over the projection, 1995 to 2040.”

In addition TIMBR-1 -- Section.5.2.2 states that “The expected increase in timber prices has two effects. One is to dampen slightly the demand for land in urban uses. As a result, urban land is forecast to be at about 52 million acres rather than 55 million acres in 2020 and at 72 million acres rather than 81 million acres in 2040. The other effect is that some agricultural land would be planted to forest cover. Roughly 8 million acres would be planted by 2020 and 23 million acres by 2040 (Figure 10). The net effects are: (1) urban area expands, (2) forest change is nil, and (3) agricultural and other land declines. Consistent with history, gross changes among land uses would continue to be substantial.” The final report needs to address the following issues:

- The SFRA glossary defines forest as “forest: an assemblage of woody vegetation typically attaining positions in a plant community at the tallest level; attains height and diameter growth of canopy-layer trees within established averages for the species.” (can’t see the forest for the tall trees)
- And defines forestland as “forest land: Land that is at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for non-forest use. The minimum area considered for classification is 1 acre. Forested strips must be at least 120 feet wide.”

- It is almost as if this definition was constructed to allow small and large pine plantations to be included in the definition of forests when in fact they should be included as agriculture.
- Most people define a forest as a complex assemblage of tree species and understory. Even Webster's New Collegiate Dictionary defines a forest as a "dense growth of trees and underbrush" (understory is not even included in the SFRA definition and 16.7% is certainly not dense growth of trees.).
- A pine plantation is defined as a forest type stating "Pine plantation: Stands that (a) have been artificially regenerated by planting or direct seeding (b) are classed as a pine or other softwood forest type, and (c) have at least 10 percent stocking."
- Thus, Pine Plantations, according to the SFRA are forest types that have even less stocking (as few as 5 trees per acre) than other forests. There is no requirement for diversity and no requirement for understory. By the SFRA definition even large residential yards with 5 trees could be considered forestland.
- SFRA needs to make a clear statement about what constitutes a forest and why a pine plantation is considered a forest rather than an agricultural crop. If pine plantations are a crop, the forestland converted to pine plantations needs to be considered as agricultural land and added to forestland lost in the land use change equation to arrive at a figure for forest loss.
- When defining pine plantations, make a clear statement concerning the biological diversity found on pine plantations compared to native hard and softwood forests.
- When a native hardwood forest is converted to a pine plantation, what percentage of diversity is retained?
- When a native pine forest is converted to a pine plantation what percentage of diversity is retained?

## **Errors**

1. Section 5.1.3 states that "The proportion of output going to fuelwood in the 1950s was over 20 percent; it has since dropped to under 3 percent..... Between 1954 and 1996, the percentage of wood removed as sawlogs was nearly constant, at around 38 percent. Pulpwood's share rose from 21 percent in 1952 to 47 percent in 1972 and has since leveled off at around 40 percent. The proportion of output in the form of the largest and highest quality logs, veneer logs, has trended upward, from 3 percent in 1952 to about 9 percent in the 1990s. Hence, in contrast to the trend toward more wood products derived from chipped material, the importance of sawmills, especially those manufacturing hardwood lumber and veneer, has risen or been maintained." The final report needs to address the following issues:
  - According to the most recent data from USDA "Assessment of Timber Product Output and Use" (individual USDA-FS publication for each state, 1995-1997) for all southern states except Texas, pulpwood accounts for 47% of output, sawlogs 42%, veneer 8%,

composite panels 2%, other industrial uses 2%. This data makes it very misleading to say that “.... the importance of sawmills, especially those manufacturing hardwood lumber and veneer, has risen or been maintained.”

- As a share of the overall market, sawtimber has declined in importance (from being the #1 wood commodity in 1952 to being #2 as of 1996 according to Figure 14 in TMBR-1.
  - The figure that only 3% of the wood produced in the South is used for fuelwood (biomass) needs to be explained. Biomass energy has already been estimated to be consuming more of the forests annually than the pulp and paper or building products industries. The pulp and paper industry produces 70% of the nation's current bioenergy (BE) from forest based fuels. The Southern US is responsible for 50% of the nation's forest based bioenergy. Estimates range from 2.5 to 7 million acres of forests impacted annually by bioenergy fuel gathering in the US, with half of that being in the South.
2. Section 5.1.3 states “In spite of rising pulpwood production and improvements in product manufacturing efficiency, producers have not been able to increase output as fast as the economy's demands for pulp-based products have grown. .... In 1953, virtually no residues (wood chips and other wastes) were used in wood products manufactured in the South; panel and pulp production was made from roundwood. By 1998, residues accounted for over half of the volume of both softwood and hardwood fiber received at the gates of pulpmills and composite panel mills.” The final report needs to address the following issues:
- In contrast to the above finding, USFS publication Southern Pulpwood Production, 1998 (one of the study's sources) states, “Roundwood continues to be the primary fiber source used in pulp manufacture, accounting for 71% of the total pulpwood production.... An unknown proportion of the residue was chipped in the woods or was received at a primary processor as roundwood and subsequently chipped. Thus an unknown proportion of the wood chips received at pulpmills as residues should be treated as roundwood because it was not a byproduct of the milling process.” (Southern pulpwood production 1998)
  - Roundwood harvested for pulpwood comprises 71% of the wood received at pulpmills and it is an error to say that “By 1998, residues accounted for over half of the volume of both softwood and hardwood fiber received at the gates of pulpmills and composite panel mills.”
3. Section 5.1.3 states “Another way that producers of timber products in the South have adapted to rising demands, ... is the chipping of wood at satellite locations. This process is controversial because it encourages harvesting in areas not previously subject to harvesting and encouraging clearcutting, especially of natural management types that before were harvested in a different way. Many view this as negative. ....Before the 1990s, pulpmills and manufactured wood panel mills relied heavily on remote log concentration yards and maintained large chipping facilities at the site of panel and pulp manufacture. Today

pulpwood-sized logs increasingly are chipped away from the mill, and are brought to the mill as needed.” The final report needs to address the following issues:

- Today there are hundreds of concentration yards (perhaps even more than pre 1990) serving satellite chip mills and expanding their sourcing areas which further “encourages harvesting in areas not previously subject to harvesting and encouraging clearcutting.”
4. Section 5.1.3 states “Chip mills processed about 27 percent of the pulpwood in the South in 1999 (Hyldahl and others 2000). They produced 47 million green tons of chips in 1998, 45 million green tons in 1999, and 39 million green tons in 2000. In 1999, approximately 42 percent was softwood and 58 percent was hardwood.” The final report needs to address the following issues:
- Where does the other 73% of the pulpwood go? The distinction between satellite chip mills and chip mills attached to processing facilities is irrelevant here because pulpwood is wood that is used for the production of pulp and chipping is a primary step in the conversion of pulpwood into pulp. It therefore seems, by definition, that 100% of pulpwood is processed by chip mills (both satellite mills and those chip mills attached to existing processing facilities).
5. Section 5.1.3 states that the current distribution of these remote or “stand-alone” chip mills is shown in Figure 10. This map gives a false impression of the magnitude of the wood chipping industry by only identifying the locations of satellite chip mills. For example, at least four chip mills in Tennessee are omitted from Figure 10 -- Bowater’s mill in Calhoun, Packaging Corporation of America in Hardin, JM Huber in Spring City, and Waverly Wood Products in Waverly. Each of these facilities has chip mills associated with their production facility. This map should include all chip mills, regardless of whether they are “stand alone” facilities or attached to a processing facility.

#### **Opportunities for additional synthesis of findings –**

The SERTS model seems to assume that all owners are equally likely to harvest their timber or plant pine given certain economic conditions. TIMBER 1 section 3 states “As with many forecasting models, an underlying assumption in SERTS for this Assessment is that timber supply and demand and land use supply and demand relationships remain stable. In that sense, the projections do not account for changes in the share of the “available” or harvestable timber out of all timberlands owned by various owner categories (including government, industry, or nonindustrial private).”

Yet, land ownership in the south is currently changing. Forest industry acreage is declining, TIMO and private noncorporate ownership is increasing. These changes in ownership must be considered in order to accurately determine the projected timber available for harvest and the acreage available for conversion to pine. Assuming that ownership and owner intentions are static variables is unrealistic (see comments in HEALTH 1, Key Findings).

#### **TIMBR-2: What are the status and trends of forest management practices in the South?**



### **Gaps in the study data or analysis –**

1. Much emphasis is placed on more intensive management of plantations throughout the SFRA, however there is no analysis of the impacts of these practices on soil quality. This is a critical gap in the analysis that must be addressed. There is at least some literature on the subject that should be included in TIMBER-2. A USFS study concluded that short rotation cutting “places demands upon the soil that may exceed the natural supplying capability of the system and that new practices in forestry “have increased removal of nutrients from the soil. The same study found that:

“...short rotations and whole tree harvests have the potential to remove nutrients and accelerate other outputs to a rate that will decrease the systems supply of [nutrients]. This decrease in reserves can influence the availability to the extent that productivity may decline after one or more rotations. Where fertilizer is now applied to increase growth, intensive harvest will increase the need for additional nutrients.” (Wellsand Jorgensen, *Effect of Intensive Timber Harvesting on Nutrient Supply and Sustained Productivity*, Southeast Forest Experiment Station, USDA Forest Service.)

The finding in TIMBER-2 Section 5.1 that chemical fertilization increased by 800% from 1990 to 1999 suggests this may already be happening in the South.

2. There is no discussion in the report of describing either the extent or impacts of specific management techniques that result from “more intensive management”. For example, what are the long-term ecological and productivity implications of increased reliance on genetically modified trees? Do the models forecasting increased productivity include genetically engineered tree species? What are the long-term implications of increased spraying of chemicals? What are the chemicals used in forestry operations and what are their known effects on humans and wildlife? What are the ecological implications of increased use of chemicals for water quality?

### **(b) Additional fine detail needed in discussions –**

1. Section 5.1 states “Management practices represented by FIA data include clearcutting, partial cutting, thinning, timber stand improvement (TSI), site preparation, burning, planting, and natural regeneration.” “In the Southeast, partial cutting, seed-tree cutting, and salvage cutting categories were merged into one partial cutting category that corresponds to the South-Central's partial cutting category.” (Timber 2.4) “Clearcutting occurs on about 2 million acres annually. Upland hardwood accounts for 38 percent of harvested land, and is followed by planted pine with 22 percent. ...Partial cutting is much more widespread, occurring on about 3.3 million acres annually. It has increased by 12 percent over the period between the two FIA surveys.” The final report needs to address the following issues:
  - These cutting terms need to be defined. Only “seed tree” is defined in the glossary as an even age cutting technique.
  - It needs to be made clear that all management methods in the “partial cut” category are even age management.

- It needs to be stated that 5.3 million acres of timberland (or under the SFRA definition, forestland) is under even age management per year in the Southeast and that this is equivalent to 1/40 of all the timberland in the Southeast.
- In addition, while total area of forestland lost to sprawl was calculated for the entire 40 year study period, the total area of forestland harvested during the same period was not calculated and included in the Executive Summary.

2. TIMBR 2 documents a 50% increase in harvest through 2040 but does not project overall annual increase in cutting rates, total acreage harvested through 2040 and the effect of this increase in harvest on rotations. For example, if even aged cuts currently occur on 5.3 million acres/year, a 50% increase would result in 8 million acres of even aged cutting annually by 2040. Over the course of the 40 year period, that means an estimated 270 million acres of forests will be logged. What does this mean regarding rotations on pine plantations and natural forests?

**3. TMBR 2 Key Findings** states “Forestry incentives programs have supported tree planting, management planning, and improvement of forest management practices, substantially increasing planted pine area, timber production returns, and environmental benefits.” Yet, other areas of the SFRA make it clear that managed-planted pine is not beneficial to the environment for example “Pine plantations generally provide ‘poor wildlife habitat.’” (TERRA-4 -- Section 5.2.2.4) In addition, there is no analysis of the environmental impacts of increased chemical use. There is no basis for this conclusion as there is not a full assessment of the environmental effects of pine plantation management.

### **TIMBR-3: How might existing and new technologies influence forest operations and resultant conditions of forests?**

#### **Gaps in the study data or analysis**

1. Timber 3 documents and analyzes forest management methods mostly based on the costs and benefits of these management techniques for the landowner or the logger. Most of the techniques discussed are management methods employed to maximize the profits of plantations (i.e. burning, rotation rates, thinning, pruning, timber stand improvement, site preparation, planting, prescribed fire, vegetation control, and fertilization). No consideration is given to the options or management techniques designed for water quality, wildlife, esthetics or the profits that can be gained from these management techniques. For example, some states and municipalities, like New York, have realized sizable savings in water treatment by preserving forests and watersheds. Timber 3 needs to consider more than just the wages paid to loggers and number of people employed and the turnover of land and soil caused by various forest management methods. Timber 3 needs to also consider the cost of these methods to communities and the benefits of more benign management methods.

2. 2. TMBR 3 acknowledges that that 70% of the soil may be disturbed on clearcuts but states this in a way that minimizes its significance: “At least 30 percent of the stand remains undisturbed, even in clearcuts.”

### **Errors and Opportunities for Synthesis of Findings**

1. Timber 3 states that today’s management methods are “environmentally sensitive” but never presents hard data to substantiate this claim or compare the environmental benefits of benign management to more intensively managed forests (see following). This introduction leads the reader to believe that harvest techniques are environmentally sensitive and therefore harmless, However, this statement is contradicted in the text of TIMBR 3 as well as in other Chapters throughout the report. For example, TIMBR 3 states that: “Forest operations alter the environment. Some of these effects are intended; others are undesirable consequences. Most impacts are associated with driving equipment and moving material in the forest. Soil, water, and residual vegetation can be affected. Effects must be considered in terms of their quantity, severity, persistence and location within the landscape. Some impacts are short-lived, while others may affect the long-term productivity of the forest. Impacts that are concentrated may be significant, while the same impacts spread across a stand may not be ecologically important.” Other Chapters in the SFRA including TERRA, AQUA, and HLTH provide more information about the effects of forest management on water and soil which should be incorporated here for consistency.

2. The introduction needs to represent the findings reported in the text and not portray modern logging methods as being “environmentally sensitive”. Disturbing 70% of the soil on a clearcut is not environmentally sensitive nor is long lasting loss of productivity due to soil compaction . The introduction of this section should state that varying degrees of environmental damage can result from various treatments and not that modern methods are “environmentally sensitive”.

3. Section 5.1.3 on Operations Training states: “A key component in forest operations technology is the skill and expertise of loggers. The Sustainable Forestry Initiative adopted in 1994 by the American Forest and Paper Association provided an incentive to promote logger training. Member companies support programs through financial contributions and by performance expectations established for their suppliers. A second key factor was the development of new OSHA logging safety regulations in 1996. In response, all but one Southern State developed some form of logger training and education (Forest Resource Association 2000). Oklahoma sends its people to courses in Arkansas. Curricula vary, but generally include safety and first aid, business management, best management practices (BMP's), environmental considerations, and forest management. Some courses are for supervisors, while others are for workers. Graduates receive formal recognition and may be required to remain current through continuing education. In 1999, 8,254 contractors and employees completed some form of a logger training and education course.”

- If SFI is going to be touted as an effective training program for loggers, this section needs to talk about actual results and effectiveness of the program. How much has SFI training actually improved the practices of loggers? This data needs to be stated rather than simply endorsing the program to give the appearance of improvement in logging practices.
- The same holds true when endorsing state run training programs. A more thorough discussion of the effectiveness of these programs is needed. Perhaps a chart showing how

BMP compliance has changed (for better or worse) by state since the programs were instituted would be instructive. Also, a report on the classroom hours actually dedicated to BMPs and environmental considerations compared to first aid, book keeping, equipment maintenance would be a good inclusion. In some states (for example Tennessee) only one day is dedicated to BMPs while the remainder of the course concerns first aid, equipment maintenance, and business management.

4. The Key Findings state: “Timberland owned by forest industry declined for the first time between 1989 and 1999. Private corporate ownership rose from less than 16 million acres in 1982 to nearly 20 million acres in 1999, partly due to increased holdings by Timber Investment and Management Organizations (TIMOs). And in TMBR 2, TIMOs controlled 4.2 million acres, or 2 percent of the South's timberland area in 1999. This is an error. TIMOs own and control much more than 4.2 million acres. Plum Creek, a self-proclaimed pure TIMO alone owns 4,900,000 acres in the Southeast. Hancock owns nearly 2,000,000. St. Joe Timberland owns over 800,000 acres and Molpus, Joshua Timberlands, Deltic Timber, Watchovia, The Forestland Group, and Forest Systems own or control at least another 3,000,000 acres. TIMO’s control at least 10-11 million acres of forestland or about 5% of the total southeastern forestland.

### **HLTH-1: What are the history, status, and projected future of southern forests?**

#### **Need for additional detail in analysis**

1. Key Findings—It is nice to have the results summarized at the beginning like this, but to make them understandable, the key findings need more explanation.

2. The Key Findings state, “Area of timberland has increased by 5 million acres during the past 10 years. Since 1952 the area of hardwoods and oak-pine has increased while pine area has decreased.” What has happened with pine area in the last 10 years? How much of the increase in timberland in the last 10 years been due to the increase in planted pine?

3. Key Findings state: “Urbanization surpassed agriculture as the primary cause of loss of forestland in 1984. As of 1987, the South began gaining forestland faster than it was being lost. By 1990, annual gains in forest land amounted to 1.3 million acres, while diversions of forest land to other uses amounted to 841,000 acres.” How much of this “gain” in forestland was attributable to planted pine?

4. Key Findings state: “ As of 1999, nonindustrial private forest (NIPF) landowners controlled 71 percent of the timberland area; they have held at least 70 percent of the total growing-stock volume since 1953.” This section needs to consider not only the acreage owned by the traditional ownership classes, but also the ownership by acreage. For example, studies have shown that in areas heavily impacted by the forest industry (i.e. the Cumberland Plateau of Tennessee), as few as 8% of the landowners own over 50% of the forestland. This may be a subject to be covered in **subregional regional focus areas.**

Despite the fact that there are thousands of owners, very few of these owners control a majority of the forests. Furthermore, a large number of owners (especially owners of small tracts) hold their forests for reasons other than profit. Thus, 8% of the owners are largely responsible for the

majority of harvest impacts. The willingness to harvest by ownership classes also needs to be considered in the SRTS model used in TIMBER 1. The SERTS model seems to assume that all owners are equally likely to harvest their timber or plant pine given certain economic conditions. TIMBER 1 section 3 states "As with many forecasting models, an underlying assumption in SRTS for this Assessment is that timber supply and demand and land use supply and demand relationships remain stable. In that sense, the projections do not account for changes in the share of the "available" or harvestable timber out of all timberlands owned by various owner categories (including government, industry, or nonindustrial private)."

6. "Average annual removals of softwood growing stock exceeded average annual growth for the first time in 1999. However, softwood growth should rise once trees on 21 million acres of softwood saplings/seedlings stands reach growing-stock size and begin contributing to estimates of net annual growth." It is unclear whether or not this projection has considered the hundreds of thousands or perhaps millions of acres of planted pines lost over the last 4 years in Tennessee and other southern states to the epidemic of the pine beetle. In many regions this pest has caused the premature cutting or death of thousands of acres of pine plantation growing stock. In some regions only saplings/seedlings remain. A statement about the unreliability of projections should be included in this section and all other sections that discuss the contribution of pine plantations to future growth to removal ratios.

7. Section 5.1.2 states: "From 1980 to 1986, average annual rate of diversions remained fairly stable at around 1 million acres. Annual additions to forest land rose from 839,000 acres in 1980, to 972,000 acres by 1986. Cumulative losses of forest since 1980 amounted to 6.6 million acres, but additions totaled 5.5 million acres, for a net loss of 1.1 million acres over the period. There also is evidence that the more recent Federal incentives, such as the Conservation Reserve Program established in 1985, have helped slow the rate of diversion. A milestone was reached in 1987 when the South gained more forest land than it lost. That year, 1 million acres were added to the timber base, while 953,000 acres were diverted to other uses. By 1990, nonforest land was being converted to forest at a rate of 1.3 million acres, and diversions out of the timber base declined to 841,000 acres annually. Cumulative additions over the last 4 years of the period amount to 4.9 million acres, and diversions totaled 3.5 million acres."

This section is key to the understanding of forest loss and gain. Unfortunately, this section does not make clear how much of the forest "additions" are due to the establishment of pine plantations and how much are due to regeneration of natural pine or hardwood forests. This information is important because of the vast differences between natural forests and plantation "forests" documented in other portions of the SFRA.

Rather than including plantations in forests, it is more appropriate to include plantation acreage in the agriculture acreage. This would give a more accurate total for acreage in various land uses.

8. Section 5.1.3 states, "Corporate ownership rose from 16 million acres in 1982 to about 20 million acres in 1999. Recent additions to the corporate owner class are the timber investment and management organizations (TIMO's). Some 4 million acres of timberland in the South were in the hands of TIMO's in 1999 (TIMBR-2). The outlook is for increased corporate investment in the South's timberland by these and similar companies. The rise in corporate timberland and the

decline in timberland owned by forest industry is a recent trend seen in several Southern States (Table 2). If this trend continues, corporate timberland will eventually play a larger role in the South's timber industry, perhaps offsetting the loss of acres owned by forest industry.”

“The final component of the NIPF owner class is private individuals. Individuals typically have owned the largest share of southern timberland and held 76 million acres in 1999. The 1999 estimate represents a 9-percent increase in timberland area held by private individuals since 1989, and an 18-percent increase since 1982.”

This section needs to consider not only the acreage owned by the traditional ownership classes, but also the ownership by acreage. For example, studies have shown that in areas heavily impacted by the forest industry (i. e. the Cumberland Plateau of Tennessee), as few as 8% of the landowners own over 50% of the forestland.

Despite the fact that there are thousands of owners, very few of these owners control a majority of the forests. Furthermore, the majority of owners hold their forests for reasons other than profit. Thus, 8% of the owners are largely responsible for the majority of harvest impacts. This may be a subject to be covered in **Potential subregional focus areas**.

The willingness to harvest by ownership classes also needs to be considered in the SRTS model used in TIMBER 1. The SERTS model seems to assume that all owners are equally likely to harvest their timber or plant pine given certain economic conditions. This is not what data shows.

### **Gaps in the analysis**

Much more discussion is required in the section on the impacts of the Pine Beetle on mortality rates and future productivity. In addition, causes of the increased occurrence of Pine Beetle infestations need to be discussed.

### **Errors**

In this section it states, “The current forest inventory methodology is a mapped-plot design, used for the first time during the 1997 inventory of Georgia and for the 1999 survey of Tennessee. In addition to using a new sampling design, FIA in the South is currently changing from its traditional periodic inventories, to an annual forest inventory system.” This is misleading. In fact, under the new methodology, 1/5 of each state will be completed every year so that a complete survey will be done every 5 years instead of every 10 years. Calling this an “annual forest inventory system” leads the reader to believe that a complete state inventory is conducted every year. This is not the case and needs to be clarified.

## **5. AQUA: Watersheds, Aquatic/Riparian Ecosystems, and Forested Wetlands**

**General Comments** – In general the AQUA reports are informative and well written. They contain a large amount of useful background material. However, the region-wide, broad-brush approach limits their utility to decisionmakers and the public interested in specific local and sub-regional issues on the ground (we discuss this issue in greater detail below). It also limits their usefulness in determining the “small areas” that are by design the second (and more important)

“tier” of the SFRA study. This shortcoming needs to be corrected in the final study if it is to fulfill its stated objectives.

Three specific areas where we believe the information in the AQUA reports does not support the general conclusions drawn in the Key Findings. First, water quality problems associated with cutting and removing timber are understated. The point is not that silviculture is *only* number 10 out of 11 “major” sources of water quality degradation but that it *is* one of the top 10 causes and operates cumulatively with most of the other 10 in contributing sediment, nutrients, and toxic chemicals to the South’s waterways. A major effort of synthesizing cumulative water quality impacts of all “major” sources of water quality at the stream reach and watershed level is imperative. That is the only way to prioritize water quality protection efforts.

Second, the effectiveness and compliance with voluntary BMPs is assumed and overestimated, and third, losses of wetlands and aquatic species are noted but largely ignored in the analysis. These points are important enough to warrant mention in the Executive Summary and Summary Report, as well as substantial additional discussion in the AQUA Technical Report papers. Our specific comments on the individual AQUA Technical Report papers follow.

#### **AQUA-1: What are the history, status, and likely future of water quality in southern forested watersheds?**

**General Comment** – This Section lacks sufficient detail on a subregional “small area” scale necessary for stakeholders and decision-makers to develop forest policy regarding water quality. Most importantly, the water quality impacts of cutting and removing timber are largely considered region-wide and in a vacuum with regard to other activities that affect water quality. In the real world, water quality impacts are cumulative. The watershed integrates everything that is released into it in its instream water quality.

#### **Gaps in the study data or analysis –**

1. Cumulative impact analysis of the combined nature of impacts of cutting and removing timber along with the other ten “major” causes of water quality impairment is missing. One of the Key Findings in Section 3.4.1 of the Summary Report of the study notes that there is very little information available on the cumulative impacts of past and ongoing timber harvesting and management on overall watershed health. But, very importantly, the discussion does not suggest how additional study or data gathering might fill this gap. This point is important enough to warrant further analysis in this paper and mention in the Key Findings section of this paper and in the Broad Findings of Executive Summary and Summary Report, as well.
2. In its discussion of “Incentive and Stewardship Programs” in Section 5.4.5, the study mentions the American Forest and Paper Association’s Sustainable Forestry Initiative (SFI) certification program, the USFS Forest Stewardship Program, and the Stewardship Incentive Program. However, the discussion fails to mention, the Forest Stewardship Council (FSC) certification program and contains no analysis of the differences between these various programs.

3. Focusing water quality examination in Section 5.2 at the overall regional level when the effects of most pollution are concentrated at the reach and subwatershed levels where they occur (and only accumulate collectively downstream) is incorrect. As Section 6 notes: “In almost all instances, designation of the causes or sources of a particular water-quality impairment occurs within individual river miles. Land use, as a source of pollution, clearly plays a more significant role in degrading water quality at a local level.” Thus, it is vital to direct the inquiry at the watershed and subwatershed levels either to assess the direct impact of individual practices, such as timber harvest and removal, or more importantly to assess the overall impact of timber harvest and removal in conjunction with other activities producing sediment and nutrients. These impacts are very site specific and not likely to be accurately assessed at the regional level.

#### **Additional fine detail needed in discussions**

1. Section 1, Key Findings, notes “. . . water quality has generally improved since the passage of the Clean Water Act in 1972.” This statement should be qualified by the statement in Section 5.2.1.1 that “[f]rom 1988 to 1998, 9 of the 13 Southern States reported an increase in impaired river miles. The percentage of river miles that were impaired rose from 26 to 45 during the 10-year period.”
2. Section 1, Key Findings, notes “The leading sources of water quality impairment in the South from 1988 to 1998 were agriculture and urbanization; silviculture ranked 10th out of 11 major sources of impairment during this time.” The way in which this Key Finding is stated, minimizes the importance of timber cutting and removal as a “major” impact on water quality. This finding should read: “Forestry ranked 10th out of 11 major sources of water quality impairment in the South from 1988 to 1998 and combined cumulatively with other, larger major sources of impairment, such as agriculture and urbanization to impact overall water quality.” This linking of major pollutants is particularly valid because agricultural and urbanization impacts, like forestry impacts, are characterized by siltation and nutrients (two of the three most important water pollutants) and therefore accumulate collectively in the watersheds in which they occur mutually.

In addition, due to inadequate monitoring of logging operations and their impact on water quality (as discussed in more detail below) this statistic is suspect.

3. Analysis is carried out at the regional level, which is a good start but not “fine” enough scale to show most forestry impacts. Such effects on water quality are seen locally at the streamside (i.e., the reach and subwatershed levels). The discussion of watershed indicators in Sections 1.1, 1.2, and 5.2.2 is limited to the USGS 8-digit HUC watersheds used in EPA’s Index of Watershed Indicators. This level of watershed information is insufficient for adequately examining most timber cutting and removal impacts. Use of the smaller area 12-digit HUCs would be a more appropriate scale for such analysis. The availability and use of this level geographic information should be discussed in this paper.
4. The discussion of sources of land-use data in Section 1.2 limits itself to the USFS Forest Inventory Analysis (FIA) data, noting that it is derived from aggregating detailed plot analysis up to larger land areas, in this case the USGS 8-digit HUC watersheds discussed



above. This type of data aggregation does not result in the statistical level of confidence necessary for the type of projections needed, or to “see” the types of water quality degradation resulting from timber cutting and removal, which typically occur at the stream reach and subwatershed level. The use of more “real world” data sources that can “see” these impacts, such as a satellite-data based approach, should be discussed in this paper.

## **Errors**

The conclusion in Section 6: “Future trends in water quality in the South include . . . increased . . . implementation of BMPs,” does not appear to be assured or even supported by the discussion in the paper.

Because BMP implementation is poorly monitored at the reach and watershed level, we believe the above conclusion is in error. This issue is discussed in greater detail in our comments on AQUA-4.

## **Opportunities for additional synthesis of findings –**

The key area where an opportunity for additional synthesis of findings exists is in the area of cumulative impacts analysis, as noted in the discussion in Section 7 identifying among the “additional research needs necessary” as the need to “[r]esearch and incorporate downstream cumulative impacts in watershed assessment and management.” An important tool for this synthesis identified in this same section is to “[d]evelop and integrate standardize tools for water quality assessment, including modeling, use and interpretation of satellite imagery, and remote sensing.”

## **(e) Potential subregional focus areas –**

The scale of analysis necessary to examine impacts to water quality from timber cutting and removal, directly and, more importantly, cumulatively with other sediment and nutrient producing activities, dictates a thoroughly “subregional” focus. As noted in Section 5.3.1:

The scale of any watershed analysis is critical to determining specific relationships between land uses and water quality. Effects of land uses, including silvicultural practices, on water quality and aquatic biota are best studied and summarized at much smaller scales. This level of analysis was not possible for this report.

Therefore, we would conclude that this very site-specific “much smaller scale” focus is *necessary* to adequately assess the type of water quality impacts discussed in this paper – not simply a *potential* focus area. It is premature to draw some of the conclusions regarding the “minimal” effects of forestry until such small scale evaluation has been conducted.

We recommend additional study on the impacts of industrial forestry practices in the Green Swamp of eastern North Carolina and the Cumberland Plateau in Tennessee.

## **AQUA-2: What are the history, status, and likely future of forested wetlands in the South?**

**General Comment** -- The paper lacks detailed subregional data, limiting the utility of this report for predicting the future of forested wetlands in the South. For example, reliance on the National Wetlands Inventory (NWI) reports for determining the extent of forested wetlands typically understates the amount of wetlands considered because of the large-scale, aerial photographic analysis nature of their compilation. On-the-ground wetland delineations consistently result in the finding of wetland areas that are not depicted on the NWI maps. In addition, the exemption of ongoing silvicultural activities from regulation under Section 404 of the Clean Water Act results in additional underestimation of wetland areas logged.

### **Opportunities for synthesis**

1. Section 1, Key Findings, states “According to the National Wetland Inventory, 3.5 million acres of southern forested wetland underwent changes between 1986-1997. Ninety percent of the changes were conversions to another wetland or aquatic habitat type. Of these conversions 95 percent were to scrub-shrub or emergent wetlands.” The same Key Finding also states “102,00 acres (sic – more likely intended to be 102,000 acres) underwent intensive silviculture.” Although the assumption from these statements is that the ninety percent changed to “scrub-shrub or emergent wetlands” were *not* because of silvicultural activities, it is unclear what other activity could have made such a conversion. This needs to be explained, since it is not at all clear that another activity could have resulted in such a conversion. For example, Section 5.1 notes “The change in forested wetland acres during this time period was approximately 3 percent ([Table 1](#)). Dahl (2000) estimated that nationally 4 million acres of forested wetland underwent some change in condition between 1986 and 1997. Most were converted to freshwater shrub wetlands by timber harvesting or other processes that removed the tree canopy but retained the wetland character.” This would imply that the Key Finding, as written, is misleading and needs to be modified to reflect the extent of wetland modification by timber cutting and removal during this period.
2. Section 5.2 notes: “Lockaby and others (1999) point out that few generalizations can be made about biogeochemical cycling and nutrient retention functions because of the variable nature of responses of riverine wetlands to harvests, and the inability of current scientific methods to detect subtle biogeochemical changes due to silvicultural activities. Thus, they conclude that the ability to predict whether long-term shifts in biogeochemical transformations occur due to silviculture is minimal and that there is a critical need to understand how silviculture affects the enhancement of water quality in riverine wetlands.”

There is clearly uncertainty about the impacts of timber cutting and removal in wetlands. This point is important enough to warrant mention in the Key Findings section of this paper and in the Executive Summary and Summary Report, as well.

3. Section 5.4, in discussing Wetland Restoration, notes “Restoration of forested wetlands is a typical requirement of the Section 404 permitting program. Although many small-scale wetland restoration projects have been required in the history of the Section 404 program, the Corps and EPA maintain no systematic accounting of these projects or their success.” A synthesis of restoration efforts with the voluntary (state) and mandatory (federal) BMP

implementation efforts designed to avoid wetland destruction in the first place (and thus avoid the need for restoration) should be added.

## Errors

1. Section 5.2.3 that “the effects of harvesting are short-lived and that these stands will return to pretreatment species composition.” Indeed, the authors admit almost immediately in the text that “[a]dditional long-term research is needed to continue to track the development of the plant community and ecological functions in harvested stands compared with unharvested stands.” This point is important enough to warrant mention in the Key Findings section of this paper and in the Executive Summary and Summary Report, as well.
2. The assumptions about the “naturalness” of cutover natural forested wetlands is probably overstated. Any such assumptions should be qualified. As Section 5.2.3 notes:

However, Lockaby and others (1999) point out that few generalizations can be made about biogeochemical cycling and nutrient retention functions because of the variable nature of responses of riverine wetlands to harvests, and the inability of current scientific methods to detect subtle biogeochemical changes due to silvicultural activities. Thus, they conclude that the ability to predict whether long-term shifts in biogeochemical transformations occur due to silviculture is minimal and that there is a critical need to understand how silviculture affects the enhancement of water quality in riverine wetlands.

3. Given that minimal ability to predict, it is in error to conclude, as in Section 6, that “when hydrology is not permanently altered and sites are allowed to regenerate naturally, indications are that, in time, they function similarly to unaltered wetlands.” Something more cautionary, such as the conclusion regarding pine plantations – “Sites converted to intensive pine plantation culture experience longer term changes to their structural and biotic diversity” – would be appropriate. This point is important enough to warrant mention in the Key Findings section of this paper and in the Executive Summary and Summary Report, as well.
4. The Key Finding “Offsetting losses of wetland functions through the Section 404 permitting process has not been well documented but appears to have had limited success” is not substantiated with regard to forestry-impacted wetlands by the discussion in the text in Section 5.4, which notes:

Although many small-scale wetland restoration projects have been required in the history of the Section 404 program, the Corps and EPA maintain no systematic accounting of these projects or their success. . . Little consistent data are available to track the amount of forested wetland mitigation that has been required or the amount that has actually been completed. It is even more difficult to ascribe success to many of the mitigation efforts that have been undertaken. Two studies in the South found that many of the mitigation projects proposed and carried out under the Section 404 program did not replace the wetlands originally impacted (Pfeifer and Kaiser 1995; Morgan and Roberts 1999).

The Key Finding should be changed remove the unsubstantiated “but appears to have had limited success.”

**Additional fine detail needed in discussions –**

1. Section 5.1 states “The percentage of timberland in wetland and the expected increase in timber harvest in the South (CHAPTER TIMBER-1) indicate the likelihood of additional wetland modifications due to silvicultural activities.” No further discussion of this point is contained in this section. Given the importance of wetlands in the natural environment, the general interest of the public in stopping the loss of wetlands, and the uncertainty over whether silvicultural “modification” results in temporary or permanent changes to wetlands function, this point needs additional detail. Questions that should be answered in greater detail include: (1) What is the acreage of forested wetlands expected to be modified? (2) What is the expected nature and range of the wetland modification? (3) How will BMPs be used to minimize wetland impacts?

2. The discussion in Section 5.3 of the Clean Water Act Section 404(f) silvicultural exemption points out that:

these activities must be part of an ongoing agricultural or silvicultural operation and may not change a wetland to an upland. In addition, construction of forest roads is exempt under Section 404(f) as long as 15 Federally prescribed best management practices (BMPs) are implemented. The issues surrounding forest road construction, and the BMPs used to ameliorate water quality impacts of roads are discussed further in Chapter AQUA-4.

Several important issues raised here need additional discussion. How do Southern states determine which silvicultural activities are “ongoing?” How do Southern states enforce the implementation of these “mandatory” BMPs in the context of their “voluntary” BMP programs? What types of coordination exist or could exist between the Corps of Engineers and the various state forestry agencies to ensure this BMP implementation, and to promote the restoration of forested wetlands on a more extensive scale than is currently described in this study? (Also see the following comment.)

**(e) Potential subregional focus areas --**

In International Paper’s 180,000-acre Green Swamp timber holding, the company harvests about 2,000 acres a year in the swamp. An additional 10,000 acres are thinned, where diseased or stunted trees are removed, each year. The company says it juggles its clearing and thinning operations throughout the plantation, allowing tree stands of varying ages to border each other allowing the manmade forest, as a whole, to mimic the range of habitat that occurs in natural forests. But opponents of such forestry management point to the intensive management of plantations, including the ditching and draining and the use of herbicides to limit other vegetation as degrading the ecological value of the stands. The Green Swamp, because of the intensity of timber cutting, is an important subregional focus area that should be the subject of a “small area study” as a “second tier” portion of the SFRA.

### **AQUA-3: How have forest management activities and other forest uses influenced water quality, aquatic habitat, and designated uses in forested watersheds?**

**General Comment** – This section consistently underplays the magnitude of the impacts of timber cutting and removal, both directly at the stream reach level, and cumulatively with the other “major” water quality impact producing activities at the stream reach and downstream watershed levels.

#### **Additional fine detail needed in discussions –**

1. The Key Finding “BMPs, when appropriately implemented and maintained, are very effective in controlling nonpoint sources of pollution. They are particularly important in areas with steep topography” needs additional detail. It should be explained up-front what happens when BMPs are not “appropriately implemented” as described briefly in Section 4 of the paper. This Key finding should be changed as follows:

BMPs are critical to preventing water quality degradation from silviculture. When appropriately implemented and maintained, they can be very effective in controlling nonpoint sources of pollution; however, when not appropriately implemented, water quality degradation is likely to occur, especially in areas with steep topography.

2. The Key Finding “Most impacts are short-term (first several years after harvest), decreasing over time as vegetation regrows” needs additional detail. At the site level, this may be accurate, but not accurate at the cumulative scale when logging is occurring throughout the watershed at various points in time. This Key Finding should be rewritten to incorporate the reality of cumulative impacts over time of logging in different areas within the same watershed.

#### **Errors**

The Key Finding “When compared with other land uses in the South, silvicultural activities are consistently found to be minor nonpoint sources of water-quality impacts (see Chapter AQUA-1). Silviculture was one of the lowest “leading sources” of pollution or impairment for rivers and streams between 1988 and 1998 as reported by Southern States” is very misleading because it downplays the magnitude of timber cutting and removal impacts and ignores the fact all of the “leading sources,” as well as other smaller sources, operate cumulatively in downstream reaches and watersheds. Another Key Point “There is very little information available on the cumulative effects of past and ongoing timber harvesting on overall watershed health,” contradicts the finding that silvicultural impacts to water quality are not significant.

#### **Opportunities for additional synthesis of findings --**

The point identified as a Key Issue, that “There is very little information available on the cumulative effects of past and ongoing timber harvesting on overall watershed health” is more than an “opportunity” for additional synthesis of findings. Finding and using that information at the stream reach and watershed levels should be an absolute prerequisite to making any claims that silviculture impacts are unimportant at the stream reach and watershed levels. This point is

important enough to warrant mention in the Key Findings section of this paper and in the Executive Summary and Summary Report, as well.

**Potential subregional focus areas –**

1. The Key Finding “From 1988 to 1998, an annual average of approximately 3,600 miles of rivers and streams were considered potentially impaired by pollution from silvicultural activities throughout the South” needs to be placed in a subregional context, along with discussion of how these “impaired” miles interact with those impaired by other land use activities. The current finding is meaningless in the context presented. Clearly, the stream reaches and watersheds in which silviculture-impairment (and other causes of impairment) occur should be identified by the states at the appropriate subregional level (generally at the subwatershed, i.e., smaller than the 8-digit HUC level). Such priority stream reaches and watersheds should be examined in detail. This point is important enough to warrant mention in the Key Findings section of this paper and in the Executive Summary and Summary Report, as well.

Section 3, Methods and Data Sources, notes: “Given the magnitude of the study area and the generally localized nature of water-quality impacts from silviculture, the primary objective for this Chapter was to compile an extensive, current summary of literature on the subject. No original research was conducted.” This comment points to a crying need to conduct “new” assessments at the appropriate “localized,” reach and subwatershed contexts. This point is important enough to warrant mention Executive Summary and Summary Report, as well.

**AQUA-4: What are the implementation rates and effectiveness of BMPs in the South?**

**General Comment --** Ensuring effective forestry BMP implementation requires effective monitoring programs. There is a serious lack of such monitoring programs across the South, representing a significant governmental failure to carry out environmental responsibilities where forestry water quality impacts are concerned. In the absence of strong monitoring programs, an accurate determination of BMP compliance rates is impossible. Due to the serious weaknesses in state BMP monitoring programs across the region, state BMP compliance reports are likely inadequate and, in fact, seriously overstate forestry BMP compliance.

**(a) Gaps in the study data or analysis –**

The assumption that voluntary BMP programs are working in the Southern states represents a major gap in the study analysis. As we outline in the “error” discussion below, this assertion is not supported by the data actually assembled by various state studies, including the Missouri and North Carolina chip mill studies. Ensuring effective forestry BMP implementation requires making BMPs mandatory instead of voluntary and effectively monitoring their installation and watershed cumulative impacts.

**(b) Additional fine detail needed in discussions –**

1. Section 5.3.1 contains a reference (Williams and others, 1999) to a study in South Carolina that recommended a more detailed approach to developing BMPs tailored to the specific

needs of that state's physiographic provinces. The study of BMP implementation in the Missouri Chip Mill Study contains a similar conclusion:

Finally, there are strong technical grounds that justify conservation practices (such as BMPs) tailored to the state's three distinct physiographic regions: Appalachian Mountains, Piedmont, and Coastal Plain. Each region differs significantly in how logging impacts soil and water. Most over-riding perhaps is that of topography and slope. Both length and steepness of hillslopes make harvest activities in the mountains much more difficult than in the Piedmont or Coastal Plain. Although most logging activity in North Carolina is occurring in the Coastal Plain and Piedmont, considerable activity occurs in the mountains, and special BMPs might well be tailored for steep mountain lands in a manner analogous to the special BMPs that are drafted for North Carolina wetlands. (Richter, Daniel D. 2001. Soil and Water Effects of Modern Forest Harvest Practices in North Carolina, in *Economic and Ecologic Impacts Associated with Wood Chip Production in North Carolina*, available at <http://www.env.duke.edu/scsf/>)

The advisability of regional BMP differences, particularly in mountains and other areas of steep slopes should be discussed to provide additional fine detail needed to evaluate this proposal.

2. Analysis of regulatory versus nonregulatory approaches in Section 5.5 contains several broad observations that are misleading without additional fine detail on the problematic nature of compliance with nonregulatory BMP approach:
  - A. "The nonregulatory approach . . . is . . . still evolving. Its dependence on practitioner education, direct landowner assistance, and systematic monitoring of program effectiveness has gained momentum and widespread acceptance in the forestry community." We agree that the forestry community has certainly accepted the voluntary, nonregulatory approach. Our concern is over how well the approach is "evolving" toward actually protecting water quality at the stream reach and subwatershed level. This statement should be qualified to reflect this concern, which is widespread in the environmental community.
  - B. "Where tested, BMPs have proven effective at maintaining State water quality within applicable standards. Additional scientific validation of BMP design will serve to refine their application to fit site-specific conditions." This statement should be qualified to note that "where tested" is a very small percentage of the situations in which BMPs are "voluntarily" called for. Moreover, our ForestWatch monitoring of actual logging jobs indicates that there is no effective enforcement follow-up on voluntary BMPs, and only citizen complaints actually have much effect on launching enforcement actions when they are necessary to protect water quality.
  - C. "Success of the nonregulatory approach requires continual education efforts targeted at the ever-changing groups and individuals who own and treat the South's forests." We do not believe that "education" has much real chance of success here because the lesson most individuals are likely to learn about voluntary BMP programs is that compliance is

not required. Clearly education can encourage many people to try to comply, but experience shows that there is a sizeable group that will not comply unless threatened with some sanction if they do not.

Moreover, this section omits any substantive discussion of silvicultural regulatory programs, such as those of California, Oregon, and Washington. Those programs should be described in order that there is some standard of comparison of the advantages and disadvantages of both types of programs.

### (c) Errors --

The assertion in Section 5.4 on BMP Implementation in Southern States that "State *reports* indicate broad application of BMPs during forestry operations in the South" used to justify a conclusion that BMP *implementation* is widespread in the South is a major error in the report. The major problem with forestry BMP programs in the Southeast is the fact that with several exceptions they are *voluntary* and the current level of state monitoring of compliance is insufficient to adequately measure accurate implementation rates. The SFRA commissioned review of federal and state water quality law in the South as it pertains to forestry concluded:

In sum, water law as it affects silviculture, though driven by the mandates of the federal Clean Water Act, is primarily a matter of state enforcement and technical assistance activity, supported by federal grants under the §319 program. . . State water pollution laws are the backdrop for regulation, but silviculture is exempt from the permit requirements of those laws in every state studied. (Spier, Jerry. 2001. *State Water Quality Laws Relating to Silviculture: A Status Update for the South*, Research Agreement No. SRS 00-CR-11330133-236. The Tulane Institute for Environmental Law and Policy, January 5, 2001.)

provided that the 15 mandatory BMPs are implemented across the

Moreover, the SFRA legal review goes on to point out that BMPs, the primary methods by which forestry attempts to protect water quality, are "voluntary" in all Southern states, except Kentucky (in Virginia, the State Forester has authority to enforce BMPs to protect water quality, but has no mechanism with which to carry out his mandate).

The lack of regulatory authority to protect water quality in the southeast raises the question: can voluntary BMPs effectively protect water quality? The question is particularly germane with the rise of "industrial forestry" in the Southeast, which attempts to substitute agricultural efficiency for biodiversity and views forests essentially as fiber farms. Unfortunately the answer to this question, as we demonstrate below, is no. *SFI provides a means in which industry penalizes nonimplementation*

Industrial forestry advocates have asserted that voluntary guidelines alone are adequate to ensure water quality protection. But, in almost all of the Southern states, forestry regulators can only step in *after* the damage has already been done. Another problem is that the state agencies typically responsible for overseeing loggers are typically the same agencies responsible for promoting the growth of the wood products industry.

Forestry Agencies provide information, assistance + protection

→ for forest lands

Forestry Associations promote growth of industry



Moreover, compliance is difficult to measure precisely and many observers have criticized both the sampling methodologies employed and the conclusions reached from that sampling (as the Technical Report papers point out). We have examined forestry BMP compliance and effectiveness in North Carolina, Tennessee, and Virginia. Our findings of the weaknesses in these states' BMP monitoring and enforcement policies are summarized below.

**North Carolina** – The discussion of Regulatory Versus Nonregulatory Approaches in Section 5.5 characterizes 1995-1996 voluntary BMP compliance as follows: “Overall statewide BMP implementation was rated at 95 percent as either good or excellent. Public land was rated at 100 percent, industry land at 90 percent, and nonindustrial land at 76 percent. There was no discernable BMP implementation pattern based on slope.”

The North Carolina Division of Forest Resources (DFR) most recent compliance report, *Division of Forest Resources Forest Practice Guidelines Related to Water Quality (FPG) Compliance Report* was released February 1, 2001. In the past, as noted in your finding above, DFR has suggested that an average of 95 percent of the logging sites it inspects are in compliance with FPGs. Yet, in the absence of information about how many total sites were harvested and where the inspections took place, it is difficult to arrive at a statistically accurate compliance rate. Because there is no pre-harvest notification law in place in North Carolina, DFR's current methods of identifying when and where harvests are occurring are insufficient to ensure that DFR is indeed inspecting a statistically significant number of harvest sites. Moreover, the report does not validate the 95 percent compliance claim.

For example, latest DFR FPG compliance report indicates that DFR performed 3,662 site evaluations. For active harvest evaluations, DFR found 396 sites in compliance and 86 sites not in compliance – or a non-compliance rate of 18 percent. For completed harvest evaluations, DFR found 2,468 sites in compliance and 117 sites not in compliance – or a non-compliance rate of approximately 5 percent. Reforestation requirements were complied with much better -- of 524 site evaluations only one instance of non-compliance was observed. However, vegetative cover eventually returns to timbered sites even if nothing is done to manage them. Depending on how much time has elapsed since the timbering and the inspection, the issue of *compliance* versus *non-compliance* may be irrelevant.

Therefore, the ratio of inspected active harvest sites to inspected completed harvest sites (less than 1:5) is very troubling. The report fails even to acknowledge that DFR does not consistently conduct inspections on *active* harvest sites. There is evidence to suggest that DFR conducts inspections several months or even *years* after logging has been completed. Data collected from inspections conducted months after logging has occurred is insufficient since it is widely recognized that the most significant water quality impacts from logging occur during and shortly after harvest. In the absence of information about the timing of the inspections, claims that 95 percent of logging sites are in compliance are meaningless. The site evaluation records prepared by DFR do not contain any information about whether the inspection occurred before, during or after the harvest.

While the draft report indicates that DFR intends to focus *future* inspections on active logging sites, it fails to acknowledge how the failure to focus on active logging sites during past

inspections affects the accuracy of the reported compliance rates. The report also fails to indicate how DFR plans to identify future active logging sites in the absence of a pre-harvest notification requirement.

Finally, the report fails to adequately analyze current enforcement of FPG violations. According to the report, of 209 notices of noncompliance, only 7 (*i.e.*, 3 percent) were referred for enforcement action. This figure is unacceptably low given the 18 percent non-compliance rate noted above. In addition, there is nothing in the report that evaluates whether DFR has the resources it needs to adequately execute its inspection and enforcement responsibilities. The weaknesses in this report raise serious questions about DFR's ability to report accurately and objectively on the FPG program in North Carolina.

**Tennessee** – The discussion in Section 5.4 characterizes 1993 and 1996 voluntary BMP compliance as follows:

From the 200 sites evaluated there was a total of 1,787 individual BMP observations. Ratings for BMP categories were: roads, 59.5 percent compliance; SMZs, 70.5 percent compliance; stream crossings, 59.8 percent compliance; timber harvesting, 47.6 percent compliance; and waste disposal, 87.0 percent compliance.

In the first place, we do not see how these reported levels implementation could be characterized as “broad application” of BMPs. More importantly, even if, like North Carolina, Tennessee had reported high levels of BMP implementation, we do not believe that such reports could have been accepted as evidence of actual widespread BMP implementation or widespread protection of streams from the impacts of timber cutting and removal.

The Tennessee Department of Agriculture's Division of Forestry (TDF) does not have an annual statewide tracking system in place to indicate the effectiveness of BMP implementation, or to monitor for potential long term effects on watersheds from the upswing of industrial-scale clearcutting. Ninety-two percent of Tennessee's logging operations are not inspected for BMP compliance and water quality protection. TDF stated in a report to the House Conservation and Environment Committee in March, “Since 1994, TDEC and/or the Department of Agriculture have inspected an average of 406 logging operations annually to assure compliance with BMPs. This amounts to an average annual inspection of about 8 percent of the total number of logging operations statewide.

In fiscal year 2000, 421 sites were inspected by TDF and an additional 78 operations were evaluated in response to specific complaints or allegations of water quality violations. According to the State Forester, of the 406 average annual inspections, only 2 operations each year (or .5 percent) require enforcement action by TDEC. He attributes this excellent compliance record to Tennessee's forestry “bad actors” law, its “stop work order” law, and the Tennessee Master Logger Program, a cooperative training program coordinated by the Tennessee Forestry Association, the Division of Forestry, and the University of Tennessee Institute of Agriculture.

Dogwood Alliance, through our ForestWatch Program, has been monitoring BMP compliance in several counties in Tennessee through aerial and ground surveys. We have found the “Stop Work

Order” to be ineffective at preventing logging practices that endanger streams and wetlands. The celebrated 2000 Stop Work Order act, a statute that is still claimed to “enhance the enforcement measures” of the Bad Actors Law, is a law that looks better on paper than in the field. In practice, it hasn’t been used. TDF says the new Order “requires immediate cessation of logging activities that are creating serious water quality problems.” However, loopholes block its full potential to *stop work* and effectively protect waters of the state from bad logging practices.

In addition, Tennessee, like most other Southeastern states has no requirement for loggers to notify the state of locations of harvest sites. Consequently, TDF has no consistent way to identify the locations of active logging sites for purposes of monitoring BMP compliance. One inspector reported that he spent 3 days a week looking for sites to inspect for the remaining 2 days. Such inefficiency cannot result in reliable compliance data.

Dogwood Alliance uses aerial surveillance to locate logging sites and limits inspections to harvest sites where streams or rivers are present. Using these more efficient methods, ForestWatch inspected 12 sites in 2000. As a result of these inspections, ForestWatch filed ten water quality complaints with TDF/TDEC and the agencies ordered remedial action on nine of the sites. On the tenth site, TDF felt that the stream damage was so great that the area had “been converted into a wetland” and that “wetlands are better than streams” so no remedial action was required. Thus, in these documented instances non-compliance was staggering – in excess of 80 percent.

Dogwood Alliance only inspects about one-third of the counties in Tennessee and only inspects a fraction of the logging sites in those limited counties. If we had the time and resources to inspect more sites, the number of violations could easily be doubled. Extrapolating even the modest figure of 10 violations in one-third of the state predicts 30 violations statewide. This figure is still obviously modest, while the TDF figure of 2 violations is a gross underestimate. Thus, we conclude that Tennessee’s voluntary BMPs are inadequate to ensure meaningful protection of Tennessee’s water quality and quantity from the effects of the rapid growth of industrial-scale logging.

**Virginia** – The discussion Section 5.4 characterizes 1995-1996 voluntary BMP compliance as follows:

To be in full compliance, 100 percent of applicable BMPs at the audit site have to be 100 percent implemented and meet 100 percent of the technical specifications of the BMP manual. Measured in this way, compliance has ranged from 16 percent in 1991, to 7 (sic – there appears to be a typographical error here) percent in June 1999. Effort to implement BMPs was noted on 90 percent of the sites visited. The field evaluator indicated that 90 percent of the sites were experiencing no related water quality impacts, but 38 percent exhibited potential for impact.

As we also noted in the discussion on Tennessee BMP compliance, we do not see how these reported levels implementation could be characterized as “broad application” of BMPs. More importantly, even if, like North Carolina, Virginia had reported high levels of BMP implementation, we do not believe that such reports could have been accepted as evidence of

actual widespread BMP implementation or widespread protection of streams from the impacts of timber cutting and removal.

In Virginia the use of BMPs is voluntary but if a water quality violation results and sediment enters a stream, both the logger and landowner may be held responsible. Unfortunately many such jobs go unreported and undetected by the Virginia Department of Forestry (DOF). Thus, DOF efforts to determine compliance with BMPs is problematic at best.

For example, DOF conducted its twelfth semi-annual forestry BMP field audit on November 14, 15, and 16, 2000. In preparation for the audit a total of 30 timber harvests were randomly selected from the timber harvests listed in the DOF information system as having been inspected by DOF or industry cooperators between June 16, 2000 and November 1, 2000. Timber harvests for the audit were selected from inspections made in each of DOF's six regions. Virginia Department of Forestry. 2000. *Virginia Department of Forestry BMP Effort, Implementation, and Effectiveness Field Audit, November 2000*.

The emphasis on the high percentage of "efforts to implement" BMPs belies the poor overall performance of the BMPs in actually protecting water quality. Of particular concern is the fact that 80 percent of the sites visited did not have the requisite water quality BMPs adequately installed. And at over two-thirds of the already inadequate sites the "efforts" were such that they "lacked sufficient water control structures or had water control structures installed that did not meet DOF standards." The fact that vegetative cover, the prime determinant of sufficient runoff control, was inadequate at two-thirds of the sites visited is equally troubling. Finally, the failure of adequate SMZs at almost one-third of the sites visited is particularly troubling because of their critical importance to maintaining healthy instream environmental conditions.

Citizen observations of DOF during the audits raise additional cause for concern. In June and July 2000, Virginia Forest Watch (VAFW) accompanied Virginia Department of Forestry (DOF) staff as they preformed their semi-annual Best Management Practices (BMP) audit. For two days a water quality specialist from DOF Region 5 looked at randomly selected logging jobs in Region 6 and found water quality problems on 4 out of the 6 jobs observed. See Brooks, Steve. 2001. The Forestry Department must know where the sites are to inspect them -- Forest Watch reports logging jobs because, too often, loggers don't, *Roanoke Times*, Friday, April 06, 2001.

Noncompliance with BMPs is rampant in the Southeast. Despite efforts by the state forestry agencies to put the best face possible on the situation. Given the lack of authority Southern legislatures have given their forestry agencies to protect water quality and biodiversity, it is not surprising that the agencies put the best face possible on their environmental enforcement activities – such as they exist. But despite these attempts of forestry agencies to downplay the ecological impacts of industrial forestry, as outlined above, citizens are verifying the impact that these practices are having on water quality, as well as wildlife and general biodiversity.

It is clear from these documented cases that it is only when citizens bring attention to water quality violations that the State forestry agencies make any substantial effort to carry out their enforcement obligations. Moreover, none of the southern states have a sufficient information gathering process in place to be able to make accurate reports on the extent of water quality

degradation from forestry practices. We therefore strongly urge that references to the potential efficacy of voluntary BMP implementation in the South be reconsidered in light of the foregoing discussion.

Other studies of BMP implementation have reached the same conclusion. For example, the study of BMP implementation in the North Carolina Chip Mill Study concluded:

Based on at least two BMP surveys in North Carolina, BMPs appear to be more widely implemented in forests under professional management than forests that are not (Henson 1995, 1996). A similar result was recently observed in West Virginia (Egan 1999). This is not a small concern since a relatively large (but not well quantified) fraction of the owners of North Carolina's forestland have little or no contact with professional resources managers and no formal management plans. . .

During the course of this investigation in North Carolina, it became evident that the current system of BMPs is not widely understood. Landowners, foresters, loggers, and the general public appear to have different ideas about what FPGs and BMPs are, about what is required and what is voluntary, and about what consequences there will be if either FPGs or BMPs are not followed. In West Virginia, a state with BMPs that are arguably as well developed as in North Carolina, a recent survey of non-industrial private forest landowners indicated that 62% had no or only cursory knowledge about BMPs or best management practices (Egan 1999). A stratified random survey of North Carolinians involved with forests might well be designed to determine the level of understanding of FPGs, BMPs, and forest planning and to evaluate how to better promote owner stewardship and professional resource management on NC's private non-industrial forest land. (Richter, Daniel D. 2001. *Soil and Water Effects of Modern Forest Harvest Practices in North Carolina*, in *Economic and Ecologic Impacts Associated with Wood Chip Production in North Carolina*, available at <http://www.env.duke.edu/scsf/>)

Similarly, the study of BMP implementation in the Missouri Chip Mill Study concluded:

Surveys indicate that 12% to 16% of the timber harvest activities in Missouri are done following a plan developed by a professional forester using BMPs. It is not known to what extent BMPs are being effectively applied on the remaining harvested areas. However, it is reasonable to assume that BMPs are not being effectively applied on a significant number of timber sales. Efforts to ensure their use on all sales needs to become a priority. (see Conley, Jerry and John Smith. 2000. *Draft Report on the Chip Mill Issue*, <http://www.conservation.state.mo.us/forest/chipmills/draft.htm>)

We recommend that the federal agencies involved in the SFRA develop a program to train and certify citizens to monitor forested watersheds. This would enhance the monitoring efforts of states that are already stretched to keep up with the cumulative effects to watersheds from the multitude of land use changes. States throughout the South are reeling from recession-related budget crises that have resulted in cutbacks in agency programs and staff would benefit from certified citizen forest watch teams. Missouri Stream Team program is a model program, and in Kentucky, a citizen Waterwatch program effectively partners with the state. In Tennessee, North

Carolina, Virginia, and Missouri, the Dogwood Alliance trains citizen teams to monitor forested watersheds.

**(d) Opportunities for additional synthesis of findings --**

1. Key Finding 3 states: “Silvicultural Best Management Practices (BMPs) are designed to reduce nonpoint source pollution and maintain stream channel integrity so that State water quality standards are met. *Where their effectiveness has been evaluated, they have achieved that goal*” (emphasis added). As we have stated in these comments, our analysis of voluntary BMP implementation, as well as that of the Missouri and North Carolina chip mill studies, tends to dispute the contention that the effectiveness of BMPs achieving the goal of water quality protection has been *widely* evaluated. This would seem to be an area for additional synthesis of findings. Where has the effectiveness of BMPs effectiveness been objectively evaluated and what were the specific results. Comparing these findings with the more general and subjective evaluations that the state forestry agencies have conducted to date would appear to be the minimum effort required to qualify the results of the state reports. Simply accepting these reports at face value diminishes the credibility of the SFRA.
2. Section 6 notes: “Resource benefits provided by BMPs other than water-quality protection should be studied and documented. This information would be useful for encouraging landowner acceptance and could identify needed modifications in BMPs” This is a critical need for additional synthesis because of the large number of threatened riparian and aquatic ecosystems. Such a synthesis could lead to “biodiversity protective” as well as water quality protective BMPs. Additional synthesis in this area, combined with a second need for additional research identified in Section 6, which notes “Reasons that landowners comply or do not comply with BMPs are not well understood. Additional information of this kind would be useful for targeting outreach efforts and adjusting state programs.” This statement is not forceful enough; this information in “critical” if water quality and biodiversity are going to be protected in the areas of the Southern forest identified as stressed, threatened, and endangered.

**(e) Potential subregional focus areas --**

Section 5.3.1 notes: “Williams and others (1999) evaluated BMP effectiveness in the South Carolina Piedmont, *which they considered the most sensitive physiographic province in the State*” (emphasis added). Clearly, the Piedmont, as well as the Atlantic and Gulf coastal plains, the Appalachians, and the Cumberland Plateau physiographic provinces should have BMPs (both water quality and biodiversity protective) tailored to the specific needs of each province.

**AQUA-5: What are the history, status, and likely future of aquatic habitats and species in the South?**

**General Comment --** This paper provides useful an often critical findings on how threatened Southern aquatic ecosystems are. It is difficult to understand how the findings in AQUA-5 can coexist with the some of the findings in the TIMBR Technical Review papers and in AQUA-4 that fail to make the connection between the runoff contribution of timber cutting and removal and cumulative stresses on aquatic ecosystems. The absolutely stunning statement in the Key

Findings of this paper “Gaps in our scientific knowledge about southern aquatic species are monumental. Research of many types is urgently needed.” argues strongly for a much more “precautionary” approach to Southern forest exploitation than that projected and endorsed elsewhere in the study.

**Gaps in the study data or analysis –**

1. The Key Finding “Gaps in our scientific knowledge about southern aquatic species are monumental. Research of many types is urgently needed.” argues strongly for a major research effort in this area, since effects on water quality are one of the most important environmental impacts of timber cutting and removal. Without a much more “precautionary” approach to Southern forest exploitation than that projected and endorsed elsewhere in the study, the future of this “globally significant” habitat for “rare aquatic species,” some of which “occupy so little of their former range that they are vulnerable to extinction” is uncertain indeed. The gap that most needs filling, therefore, is the gap between the findings of this Technical Review paper and the other Technical Review papers, particularly the TIMBR papers and AQUA-4.

2. Section 2 notes:

In the East, sediment from agricultural nonpoint pollution was listed as the major stressor affecting the ability of aquatic animals to recover from declines. Wilcove and Bean (1994) made several recommendations for aquatic animal conservation. Master and others (1998) and Wilcove and Bean (1994) provided several case studies of cooperative projects in watersheds critically important to preserve aquatic diversity.

Since the aquatic impacts of timber cutting and removal are often quite proximate to the cutting area in distance and time, it is critical that these “watersheds critically important to preserve aquatic diversity” receive subregional priority as focus areas. Since the study referenced limited itself to agricultural nonpoint source pollution, timber cutting and removal produces much the same type of pollution, and often occurs in these same watersheds, the need to identify these watersheds and to consider cumulative water quality impacts constitutes a major gap in this study that needs to be filled by the “second tier” small area studies.

3. After detailing the myriad threats to aquatic ecosystems in the South, the only “summary conclusion” that appears related to forestry made in Section 5 is:

Grumbine (1990) noted difficulties in conserving rare species: “Providing for viable populations of native species on Federal lands will require some unprecedented combinations of administrative and legal reform.” Grumbine considered restoring natural fire cycles, reintroducing extirpated and endangered species, closing roads, and reforestation as important components of this reform.

Given the importance of nonpoint source pollution from timber cutting and removal and other *major* sources of sediment and nutrients, we believe that it is charitable to consider

this discussion loaded with “gaps.” In reality, the lack of a serious set of summary conclusions relating to the major impacts of timber cutting and removal is a serious error.

4. Section 6, Needs for Additional Research states “distributional information is relatively well documented for most southern fish, but there are still gaps in our knowledge. Even less is known about the other aquatic animal groups included here. Baseline information is necessary to document declines, or to predict extirpations and extinctions.” Section 6 goes on to say:

The information recommended above will be of little use, if it is not made available to those who should use it. Grumbine (1990) recommended constructing a regional database of species of concern that would include information on habitat requirements, reserves, connectivity, zoning, buffers, and ecological restoration. Some of this information already exists in various places (NatureServe, and Natural Heritage programs for example), but appropriately interpreted versions could be made available for various types of users. This Assessment is intended to be a step in that direction.

We think this is a substantial information gap. How do the federal agencies intend to make the existing and needed information “available to those who should use it?” How do the federal agencies propose for this necessary research to be conducted in these times of reduced federal and state budgets? What “precautionary” approaches to timber cutting and removal do the federal agencies propose to the states and the wood products industry to avoid exacerbating the already stressed, threatened, and endangered status of many aquatic ecosystems in the South? Without answers to these questions, serious gaps will continue to exist in what becomes a hollow call for additional research.

#### **Additional fine detail needed in discussions –**

Section 4.2.17 notes “Roads can have several adverse effects, including acting as barriers that prevent adults from migrating between nonbreeding and breeding habitats. Noise and light associated with roads may also interfere with the ability of frogs and toads to hear calls or to see and catch prey (Dodd 1997).” It is not clear from this discussion whether this generalization includes logging roads. Given the stresses amphibian species are under this clarification is important.

#### **Errors**

Section 4.2.14 states:

Pollution and sediment threats from mining, industrial, and agricultural activities, accidental spills, and urban expansion have already, or potentially could, impact most of the fish family groups or their food resources (Warren and others 2000). Sediment reduces available food organisms and may inhibit maturation of eggs, especially for crevice spawning minnows or species with bottom-dwelling larvae and young, like madtoms, darters, and some minnows. For other animal groups, developing water-quality standards based on toxicity testing of more sensitive fish species could improve this situation.



Since timber cutting and removal is one of the *major* sources of sediment and nutrient in the environment, we believe it is an error not to add a sentence to this paragraph stating that timber cutting and removal pollution cumulatively “could impact most of the fish family groups or their food resources.”

### **Opportunities for additional synthesis of findings**

Section 4.2.14 notes:

Threats to fish are many, cumulative, and interactive. The most frequent explanation for declines in southern fish is habitat alteration, which has affected all habitat types (Etnier 1997, Warren and others 1997, Williams and others 1989). Physical habitat alteration resulting from impoundment, channelization, dredging, sedimentation, ditch cleaning, and other changes that result from land treatments could affect darters, minnows, catfish, bass, pygmy sunfish, and sculpins, for example (Warren and others 2000).

This finding supports one of the major comments we have made elsewhere that the cumulative impacts of timber cutting and removal must be considered “cumulatively” and “interactively” to adequately “assess” the current state and likely future condition of the Southern forest.

### **Potential subregional focus areas**

1. Section 2 notes:

In the East, sediment from agricultural nonpoint pollution was listed as the major stressor affecting the ability of aquatic animals to recover from declines. Wilcove and Bean (1994) made several recommendations for aquatic animal conservation. Master and others (1998) and Wilcove and Bean (1994) provided several case studies of cooperative projects in watersheds critically important to preserve aquatic diversity.

Since the aquatic impacts of timber cutting and removal are often quite proximate to the cutting area in distance and time, it is critical that these “watersheds critically important to preserve aquatic diversity” receive subregional priority as focus areas. While the study referenced limited itself to agricultural nonpoint source pollution, timber cutting and removal produces much the same type of pollution and often occurs in these same watersheds and therefore constitute potential watersheds of concern for both practices.

2. Section 4.1.9 notes “Wallace and others (1992) suggest that headwater streams of the Southern Appalachians probably contain a greater diversity of aquatic insects than any other region of North America, and that fish and salamander diversity is also relatively high there. These headwater areas clearly warrant study as subregional focus areas in the “small area studies.”

3. Section 4.2.13 states:

The Waccamaw silverside is the only silverside included in this Assessment. This species probably only lives for about 1 year (Shute 1997). Silversides are upper-water residents that school in large numbers. They feed on small, planktonic invertebrates and are

believed to spawn in open water, providing no protection for the eggs or young (NatureServe 2000b). This fish is especially vulnerable because of its short lifespan, and because it is a narrow endemic, being restricted to a single lake in North Carolina.

Section 4.2.15 adds “The water quality in this lake is affected by nutrient loading from shoreline homes, agriculture, and intensive timber harvesting in the swamps surrounding the lake (Shute 1997).” Thus, the Green Swamp, which surrounds Lake Waccamaw, is a critical candidate for subregional focus in the “small area studies.”

## **6. HISTORY: Historical Overview of the Southern Forest Landscape and Associated Resources.**

**General Comment** -- The paper provides a truly interesting and useful background on which to project the changes that the SFRA believes might occur in the Southern forest between now and the years 2025 and 2040. Our general comment is that the paper perhaps overestimates the adverse environmental impacts of Native American civilizations and almost completely ignores the impacts of European settlers and the developing economy of the United States. We think that this paper should contain as interesting a discussion of the colonial and post-colonial environmental history of the South as it does of the pre-Native American and Native American periods.

We do not believe that the discussion of timber cutting and removal practices during this period presented in Technical Report paper TIMBR-\_\_ substitutes for a more extensive “economy-wide” discussion of those impacts needed here. The environmental impacts of Native American cultures are interesting, and useful from the standpoint of establishing a “healthy” environmental baseline, which we should perhaps try to achieve (hence our comment on its being “highly disturbed”). However, present timber cutting and removal practices that result in our “highly disturbed” Southern forest resemble those of our European forebears more than their Native American antecedents. Therefore, this later period of “high disturbance” is very relevant and should be discussed in this paper. There is more to the colonial and post colonial history that is relevant to projecting the environmental impacts of timber cutting and removal and other interacting processes than the discussion of fire suppression in the Background Paper on FIRE and the discussion of the timber industry in the United States from the late 1800s to the present.

### **Gaps in the study data or analysis –**

The failure to carry the historical discussion through the period from European colonization to the present is a major gap in the study data and analysis for the reasons stated above. We believe that a discussion of this period should be added to the final version of this paper.

### **Additional fine detail needed in discussions –**

In discussing the period from European colonization to the present this paper should concentrate on the environmental impacts of the major trends of development over the period that interact cumulatively with those of timber cutting and removal, both to clear the land for agriculture and for production of timber and eventually paper products.

## **Errors**

The discussion of “the Native’s Ecosystem” in Section 4.7 appears to overstate the amount of environmental impact of Native American cultures with the statement “Pollen analysis and historical eyewitness accounts depict a highly disturbed landscape.” We would not disagree that Native American cultures “modified” the landscape. However, to use the term “highly disturbed” implies a level of environmental degradation comparable to today’s “highly disturbed” Southern ecosystems. To our knowledge, there is little evidence to support such a contention, if that in fact is the author’s intent. If not, we do not believe that this impression should be retained in the final paper.

**Opportunities for additional synthesis of findings --**

Addition of the history of the colonial and post-colonial period to the present would be enhanced by a discussion/synthesis of the nature of environmental stress during the various periods. We believe that such a discussion would conclude that the level of “high disturbance” is today (and unfortunately in the future), not during the Native American period.

**(e) Potential subregional focus areas --**

The way Native American cultures used the ecosystems that today are most threatened and endangered should be examined in this paper. The difference in how later cultures have treated these ecosystems might have lessons for the future.

## **7. FIRE: Fire in Southern Forest Landscapes**

**General Comment --** The paper provides interesting and useful background information, largely ignored in the past century on the role of fire in the environment and in the human community. It presents very well the concepts of fire as a natural ecological process, of its use as a management tool by Native Americans, with substantial but not necessarily detrimental effects, its suppression by modern American society, with both positive and negative impacts, and arguments for its reintroduction into forest ecosystem management. This is a very informative paper.

**Gaps in the study data or analysis --**

The discussion of fire regimes in the Piedmont region in Section 4.2 mentions pine and hardwood species and notes that: “Pine and hardwood species from these adjacent regions overlap in the Piedmont, often occurring together in mixed pine-hardwood stands. Fire behavior may differ considerably between these regions.” The section then discusses Shortleaf pine but does not discuss any other pine species or, perhaps more importantly, any hardwood species. Hardwood species fire regimes are discussed in the sections on the Coastal Plain and Mountains and Interior Highlands. Are we to look to those discussions to discern the fire regimes in the Piedmont despite the statement that “fire behavior may differ considerably between these regions?” If so, some discussion to fill this gap should be included. This discussion is particularly important given the various competing pressures on forests in the Piedmont that may result in controversy over reintroducing or increasing the present use of fire as a forest management tool in this region.

**Additional fine detail needed in discussions --**

Section 3.1 indicates that “The role of fire was dramatically increased with the arrival of aboriginal man in America.” We feel this statement needs additional detail. How “dramatic” was

this increase – was the entire landscape suddenly on fire? We suspect what the author means that Native Americans gradually adapted the natural fire processes they encountered and ultimately “significantly” increased and controlled its use.

#### **Errors --**

As noted, we see information gaps, needs for additional detail, and opportunities for additional synthesis of discussion and findings in this paper, rather than errors.

#### **Opportunities for additional synthesis of findings --**

Section 7 on restoring fire into Southern ecosystems could benefit from additional discussion of how the positions on competing land using and other environmental interests would be dealt with if the use of fire as a forest ecosystem were to be “restored.” How widespread geographically would this use likely be? How might the increased use of fire conflict with air pollution reduction policies? Would fire be employed extensively only in sparsely populated regions, and there only on very large landholdings, to deal with potential public disapproval of its use in more populous areas. Conversely, is it feasible to educate the public sufficiently to its benefits for there to be widespread acceptance? Could the use of fire be appropriately monitored and controlled in the nonregulatory forest management environment of the South? (Potential problems with unmonitored, and therefore potentially inappropriate, use of fire appear to parallel the problems associated with the implementation of voluntary BMPs – see our discussion in Technical Report paper AQUA-4.) What would be the future application of fire in short-rotation pine plantations? (The comment in Section 3.4 that the “rising value of pine pulpwood also helped fire control efforts. . . [p]ulp and paper companies invested heavily in manufacturing plants and wanted to protect their investments” implies that fire suppression in plantations might continue.)

Such additional discussion would improve the public’s understanding of the public policy ramifications of the findings of this otherwise informative paper. This discussion should be summarized in a Key Findings section at the beginning of this paper.

#### **Potential subregional focus areas --**

As this paper already points out, interest in restoration of longleaf pine grasslands (potentially a very large subregional focus area) and the small and rare Table Mountain pine. Because of the potential for interaction with other land use and environmental issues, using fire as a forest management tool is highly site specific issue itself. Therefore, this discussion in this paper would be greatly facilitated by maps illustrating the geographic distribution of the forest communities discussed in this paper.

We appreciate the opportunity to make these comments, which we hope will assist you in making the SFRA more useful to the many stakeholders interested in the sustainability of the Southern forest. We look forward to continuing to work with you on this issue.

Sincerely,

Danna Smith  
*Director of Programs*

Attachments/Appendices as appropriate

## APPENDIX A

**SCENARIOS RELATING TO FIBER SUPPLY ISSUES (Source: Repetto, Robert and Duncan Austin. 2000. *Pure Profit: The Financial Implications of Environmental Performance*. World Resources Institute, Washington, DC – pages 12 through 16, see <http://www.wristore.com/pureprofit.html>)**

### *Timber Supply Issues*

Fiber is the most important single cost item for most mills and a key source of competitive advantage. Most fiber still comes from wood wastes, logging residues or woodchip residues from sawmills-or from trees grown for pulp. Recycled fiber use has been increasing steadily and now constitutes 34 percent of total fiber input for the U.S. pulp and paper industry (Franklin Associates, 1997).

Though the underlying determinants of fiber availability and prices are complex and subject to strong cyclical forces, the basic projection for U.S. fiber price movements over the next decade is upward, with the biggest single influence being likely reductions in domestic timber availability. A decade of high market demand for fiber and harvest restrictions in national forests has led to heavy cutting on private timberlands, depleting stocks and raising the possibility of timber shortages in the next decade.

Timber stocks in the U.S. South contribute 55 percent of total U.S. harvest and support over 70 percent of U.S. wood pulp capacity. Some studies suggest that stocks in this region may have been seriously depleted in recent years, especially in softwoods (Lyddan, 1997; Ekstrom, 1997). Current harvest rates are substantially above the most recent U.S. Forest Service projections and nearly 15 percent above forest growth rates (Haynes et. al. 1995). Moreover, some of the remaining inventory is located in ecologically sensitive areas and may not be harvestable. For example, of the 15 million acres of forestland in Virginia, Only 55 percent is available for harvest. The other 45 percent is classified as “urban” or as unsuitable due to slope, fragmented acreage, or spatial arrangement (Virginia Department of Forestry, 1995). Similarly, for the South as a whole, available timber may be 25 to 50 percent less than the overall inventory when one takes into account the stock in unsuitable areas and the objectives of the non-industrial private landholders who own two thirds of Southern timber (Lyddan, 1997).

The region will probably experience softwood timber shortages over the next decade until new plantations and forest management practices bear fruit.

The Pacific Coast, where two thirds of the timber inventory is on public lands, contributed 22 percent of the timber harvested in the United States in 1991 (Ekstrom, 1997). Since then, harvests on public lands in the Pacific Northwest have fallen drastically down 60 percent from their highs in the mid-1980s. Though timber is relatively plentiful, much of it is now off-limits and is likely to remain so. The Northern states contribute 17 percent of the U.S. harvest, though this region's inventory is less important for long-term supply because its productivity is lower than the South's or the Pacific Northwest's.

Offsetting these trends, the industry is using increasing amounts of non-fiber binders and fillers as materials as well as recycled fiber, taking advantage of substitution possibilities. In addition, fiber, pulp, and paper markets are increasingly global. Low-cost timber from Asia and Latin America supplies large, new, efficient mills that are increasing their share of world markets for market pulp and some paper grades. However, future world fiber supplies are also uncertain. Supply forecasts for industrial roundwood in 2010 range from near their present level of 1.5 billion cubic meters (m) up to 2 billion m<sup>3</sup> (Nilsson, 1996). Corresponding price forecasts for 2010 range from today's level to a level up to three times higher (FAO, 1997). On balance, the baseline forecast for global fiber prices is for increases over the next decade.

Environmental pressures may exacerbate the upward price trend. Table 2 identifies the main environmental issues that may affect U.S. virgin fiber supply. The potentially more significant issues are printed in boldface type.

*State and Local Forestry Regulations:* Timber harvesting can cause erosion, sediment runoff, and degradation of receiving waters and aquatic ecosystems. As suburbanization, prosperity, and vacation homes have spread, the number of state and local regulations affecting private timberlands have increased, aimed at safeguarding water quality, wetlands and endangered species, protecting abutting property, or minimizing site degradation. Requirements under these laws include best management practices (to minimize erosion and sedimentation), buffer zones along riparian areas, forest management plans, improved slash management, and limits on clearcutting.

**Table 2. Environmental Influences on U.S. Virgin fiber Supply**

<b>Regulations on Private Lands</b>	<b>Stricter state and local forest regulations may limit harvests from private timberlands.</b>
<b>Actions under the Endangered Species Act (ESA)</b>	<b>A reauthorized ESA may limit harvests in specific regions, especially if extended to sub-species and vigorously enforces.</b>
<b>Carbon Sequestration</b>	<b>Incentives to sequester carbon in forests for climate purposes would encourage increases in standing stock.</b>
Harvest on Public Lands	Harvests from public lands have declined dramatically and may not recover.
Environmental conflict over intensive silviculture, plantations, "fiber farms" and bioengineering	Environmental opposition may create barriers to intensive silvicultural practices and arboreal bioengineering.
Nonpoint source permitting for water quality protection	TMDL restrictions on nonpoint sources may raise forest management costs near impaired waterways.
Forestry Certification and Product Eco-labeling	Certification and eco-labeling schemes could raise fiber costs and reduce virgin fiber supply.
Tax treatment of private lands	Changes in estate, land, and capital gains taxes could affect fiber supplies from private non-industrial lands.

Southern watersheds have become the latest focus for environmental groups pressing for increased environmental regulation. Such regulation could lower anticipated timber harvest by 10 percent over the next five years (Greene and Siegel, 1994). Elsewhere, endangered species and forest protection regulations in the Pacific NW could particularly affect softwood supplies held on non-industrial private lands, while in the North, hardwood stocks are most likely to be restricted by water quality regulations. Overall, future regulations could lead to a 12 percent reduction in private harvest of hardwoods and an 8 percent reduction for softwoods in the next 10 years (Haynes et al., 1995).

However, more stringent regulation may not be inevitable. Industry may prefer comprehensive state regulations that would be more predictable and might avoid the excesses of local regulations. As an alternative to further regulations, the AF&PA has promoted its own Sustainable Forestry Initiative (SFI), under which firms commit to certain practices and standards, though not to third party certification. It is estimated that the SFI will raise delivered wood costs by about 7 percent.

**Scenario A: (Deemed less likely)** *Few new local regulations are passed and state forestry codes largely conform to the industry's sustainable forestry initiative. Overall, fiber prices continue their modest upward trend, rising at a rate of 3 percent per year in nominal terms in most areas of the U.S. and at 3.5 percent in the South.*

**Scenario B: (Deemed more likely)** *Many new state and local regulations are enacted, raising the costs of timber operations and reducing timber supply from private forest lands. Prices rise by as much as 5.2 percent per year in the South and over 4 percent per year elsewhere. Companies face significant harvesting restrictions on their timberlands.*

**Endangered Species Act:** Future private timber harvests could be further affected by the Endangered Species Act (ESA), especially if the reauthorized Act afforded protection to sub-species and specific populations. Areas of potential conflict between timber operations and species protection include Florida, the Southern Appalachians, and the Pacific Northwest. Congress has been trying unsuccessfully to reauthorize the ESA since it came up for renewal in 1992, but legislators have been caught between environmental groups eager to see changes to improve implementation and to hasten species recovery, and landowners and industry groups concerned about land use restrictions.

The official pending list for species includes 109 proposed and 164 candidate species (compared to over 1,100 species already listed as endangered or threatened). Adding these species would probably reinforce land use restrictions on existing "hot spots" rather than create new protected areas, and would have relatively small additional effects on timber supply (Flather, 1998). However, were future listings to be extended to sub-species, distinct populations, or to individual salmon stocks, then new areas would be affected, most likely in the Pacific Northwest and Southeast. Developments on this scale are unlikely over the next 10 years.

Another key issue in ESA reauthorization is the extent to which landowners will be protected from economic losses. The Clinton Administration has sought to cooperate with private landowners in developing Habitat Conservation Plans (HCPs) incorporating "No Surprises"



policies. Under these collaborations, landowners can agree on a long-term land management plan with state authorities and are then exempt from future new conservation obligations. The “No Surprises” policy has popularized HCPs among industrial landowners, but environmentalists fear they will be insufficient to protect certain species and may inhibit future species recovery steps, should such steps be necessary.

**Scenario A: (Deemed more likely)** *The ESA reauthorization is further delayed, during which time landowners can continue to draw up HCPs with “No Surprises” provisions. Eventual reauthorization mandates “No Surprises” elements. Few species are added to the lists of endangered or threatened species. Overall, the impacts on timber-supply are relatively small.*

**Scenario B: (Deemed less likely)** *The ESA is reauthorized and administered more stringently, listing some sub-species and populations in important timber areas, particularly in the Southeast and Northwest. The effect is to limit timber harvests or raise timber management costs on some private lands.*

*Public Harvests:* Most industry experts agree that the decline in harvests from public lands over the 1960s is permanent, because of the change in Administration policy, the strength of advocacy groups, and the steady erosion of the Forest Service’s harvesting capability. However, pressures may build to increase public harvests again within 10 years, mainly as an instrument for managing forest ecosystems to maintain a mixed-age forest cover (Haynes, 1998). Moreover, rising prices in the face of a timber shortage from private lands might also encourage greater harvests from public forests. Public harvests could drift upwards over the next decade, perhaps from 4 to 6 billion board feet (14 million to 21 million m<sup>3</sup>) between 2005 and 2010 (Haynes, 1998). This would mostly affect softwood supplies in the West, but would represent a small fraction of overall timber supply for the United States. Because of the likely small impact and its timing, scenarios for changes in public harvests were not elaborated in this analysis.

### ***Recycled Fiber Issues***

Assessing future recycled fiber trends requires distinguishing between impacts on the paper *recovery rate*, or how much is recovered from the waste stream, and the fiber *utilization rate*, or how much of the recovered fiber is channeled back into final products in this country. [Endnote 4: Both measures are calculated as the ratio of paper and board recovered (or utilized in paper and board products) to total consumption of paper and board products.] In the United States, the recovery rate was 40 percent (or 33 million tons) in 1995, while utilization was at 34 percent (Franklin Associates, 1997).

Paper is 32 percent of the municipal solid waste stream by weight. Because of its large share in municipal waste, paper recovery programs were stimulated in the 1980s by apparent shortages of landfill capacity (Franklin Associates, 1997). Those shortages have since abated and tipping fees for non-hazardous solid waste have fallen, but most forecasts expect paper recovery rates to keep increasing gradually.

U.S. paper recovery rates could be affected by source reduction policies for packaging, such as Extended Producer Responsibility (EPR), which places greater physical and financial responsibility for recovery and re-use of materials on the upstream supply chain. EPR programs, such as Germany's Green Dot program, are now common in Europe. Already, some U.S. states (e.g., California, for plastics) are looking into similar programs. However, industry opposition could slow progress towards EPR regulations.

Other measures to divert waste from landfills include bans for paper products, landfill surcharges or fees, and a range of collection initiatives. Rhode Island, for example, bans all recyclable materials from landfills and many other states have banned specific paper products, most commonly old newspapers or telephone directories. Other states (e.g. Florida and Minnesota) have preferred to raise land disposal fees to make landfill dumping more expensive and to generate revenue to fund recycling programs.

Trends suggest that over half the states will have bans in place for some products by 2010 and all states may have some price-raising measure or capacity limitations that will make land disposal more expensive (Alig, 1993; Ince 1996). Nonetheless, the recovery rate ultimately runs up against economic constraints, such as high collection and shipping costs from isolated rural communities. A recovery rate of 60 percent, though still well above the present recovery rate for all paper categories, may be a realistic ceiling.

In the United States, household and commercial demand for paper from recycled fiber has been limited, so manufacturing costs have largely determined recycled fiber utilization. However, government mandates and incentives may play a larger role in the future. States are now focusing more on developing markets and technologies for recycled material (Ince, 1996). By 1994, tax credits or incentives for developing recycling technologies were available in 28 states and 16 states had market development councils to promote recycling. EPA's ongoing "Jobs Through Recycling" program provides funds for state groups to develop recycling businesses. The federal government may extend Executive Order 12873, which instructs all federal agencies to give preference in procurement and acquisition to environmentally preferable goods and services, but the direct impact will probably be small. Government consumption of office papers still constitutes only 3 percent of total consumption, and many government agencies already use recycled office paper (Ince, 1996). Were federal actions to be emulated by state and local governments, other public and non-profit institutions, and private companies, they could indirectly stimulate economy-wide demand.

A potentially competing Influence would be the increased use of low-grade recovered paper as a renewable energy source, displacing fossil fuels in waste-to-energy plants. This might happen if climate policies raised fossil fuel prices and fiber prices fell.

Environmental influences bear on both the demand and supply side of the recovered materials market, and have quite different price and cost implications. Supply influences, such as restrictions on landfill disposal and subsidized municipal wastepaper recovery programs, will raise recovery rates and *reduce* recovered materials prices. Demand influences, such as mandatory recovery fiber content regulations, may also stimulate higher recovery rates but will *raise* recovered materials prices.

To explore company sensitivity to recycled fiber prices in general, high- and low-price scenarios were created, reflecting possible limits of future recycled fiber prices.

**Scenario A: (Deemed equally likely)** *Demand and supply influences combine to raise recycled prices by 2.25 percent per year in nominal terms.*

**Scenario B: (Deemed equally likely)** *Demand and supply influences are such that prices increase at a higher rate of 3.25 percent per year.*

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